SUPPORT DOCUMENT

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for the Air Operating Permit issued to

FORT JAMES CAMAS MILL
401 N.E. ADAMS STREET
CAMAS, WA 98607-1999

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
300 DESMOND DRIVE
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INTRODUCTION

This Operating Permit Support Document fulfills the operating permit rule, "Statement of Basis," requirement and explains particular portions of the air operating permit for the Fort James Camas Mill.

This document is not part of the operating permit for Fort James Camas Mill. Nothing in this document is enforceable against the permittee, unless otherwise made enforceable by permit or order.

STATEMENT OF BASIS

When the Department of Ecology issues a draft operating permit, it is required to provide a statement that sets forth the legal and factual basis for the draft permit conditions, including references to the applicable statutory or regulatory provisions [WAC 173-401-700(8)].

I. ASSURING COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS

An operating permit must contain terms and conditions that assure compliance with all applicable requirements at the time of permit issuance [WAC 173-401-600(1)]. Certain permit conditions impose a single emission limit or requirement that is based on two or more underlying applicable requirements. The tables in Appendix D of the permit present the basis for consolidating these multiple requirements into single permit conditions. Appendix A of this Document shows graphs of the historical particulate emission testing results for the No. 3 kraft recovery furnace, No. 4 kraft recovery furnace, No. 3 smelt dissolver tank, No. 4 smelt dissolver tank, No. 4 lime kiln, Magnefite recovery furnace, and No. 3 power boiler. Examples of the monthly air emission reports are included in Appendix C of this Support Document.

Compliance with the conditions in the permit constitutes compliance with applicable requirements on which the conditions and/or terms are based, as of the date the permit is issued [WAC-401-640(1)]. The Department of Ecology has determined that the requirements listed in Appendix A to the permit do not apply to the facility, as of the date the permit is issued, for the reasons specified [WAC 173-401-640(2)]. Not all of the inapplicable requirements are listed in Appendix A of the permit. Requirements that were considered obviously inapplicable were excluded from the list of inapplicable requirements.

Ecology has preferentially relied on direct source testing as the most robust and accurate method of determining compliance and, through frequency of testing, assuring compliance. Source testing is resource and time intensive. More frequent monitoring requires the use of some sort of indirect surrogate parameter. The frequency of direct source testing has been stipulated through Orders, which are included in Appendix F of the permit. Ecology has attempted to reconcile frequency of monitoring with accuracy of monitoring by relying on both direct periodic source testing and more frequent indirect monitoring using surrogate parameters.

Acknowledging the surrogate monitoring parameters as compliance indicators but not necessarily compliance determinants addresses the qualitative concerns regarding surrogate monitoring parameters. Where surrogate monitoring parameters have been employed, the Permit has been structured such that noncompliance with the surrogate limitation requires corrective action within a 24 hour time period. Failure to take corrective action and bring the surrogate parameter within bounds constitutes noncompliance with the need to follow good operation and maintenance as required by WAC 173-405-040(10). The Permit thus combines periodic direct source testing (which definitely determines compliance) with surrogate parameter monitoring requirements (indicating compliance) to achieve an overall monitoring program intended to meet the Title V requirement of "monitoring sufficient to assure compliance."

The frequency of both direct source testing and the application of surrogate parameters intended to indirectly infer compliance with the underlying applicable requirement, is based on best professional judgement of the historical probability of exceeding the imposed limitation and the potential magnitude of an exceedance. A summary of the historical emissions testing results that serve as the basis for determining the frequency of monitoring is included in this Support Document as Appendix A. In general the Department has provided for an allowance for a reduction in source testing frequency which may be allowed if particulate emission control meets certain criteria. Ecology has introduced this allowance as an incentive to encourage improved emission control. The first criterion which must be met, to allow consideration of source testing frequency reduction, is a proven history of performance. This requires a source to achieve 6 consecutive months of monthly source testing results that are not greater than 75% of the particulate emission limit. To maintain the reduction in testing frequency, no subsequent testing results can be greater than the 75% threshold. If a test result is greater, the testing frequency reverts to a monthly basis until the next 6 consecutive monthly period of improved performance has occurred.

Simply meeting the 75% threshold is not the only criteria for gaining a reduction in source testing frequency. Subjective criteria are also evaluated and ultimately best professional engineering judgement is exercised. Primary factors also considered include historical emission trends and degree of confidence in maintaining emission limit compliance between source testing events. A reduction in testing frequency would also be dependent on the strength of surrogate information available to indicate limit compliance between testing events. If a surrogate parameter was deemed "in compliance" then they were operating the control equipment in a manner consistent with good air pollution control practices. Also the surrogate is adequate for compliance indication when coupled with monthly testing but not adequate as a stand-alone compliance indicator, therefore a reduction in testing frequency would not be granted despite achieving the 75% emission allowance threshold. Ecology's intent is to provide an incentive to operate pollution control equipment and processes in a controlled stable manner so those limits can consistently be at least 75% of the applicable limit.

Incorporated into the Fort James Camas Mill permit for the No. 3 kraft recovery furnace, No. 4 kraft recovery furnace, No. 3 Smelt dissolver tank, No. 4 Smelt dissolver tank, No. 4 lime kiln, Magnefite recovery furnace, and No. 3 Power boiler is an allowance for a reduction in source testing frequency which may be allowed if particulate emission control meets certain criterion specified in Condition 19 of the permit.

Where the respective Order is the basis of authority for the required source testing and establishes the frequency of source testing, the mechanism for achieving a reduction in source testing frequency is modification of the underlying Order. The current wording in the title V permit allowing the consideration of such a reduction is designed as a placeholder such that modification of the underlying Order will not require opening the Title V permit for modification. Modification of the Order still requires a 30-day public comment period.

Representative Source Tests

Fort James Camas Mill's monthly source tests represent compliance with the standard because the time period over which the sources are tested is representative of the operation of the source throughout the month. The period of source testing is representative of operations during the entire month for the following reasons.

*Source tests are 'blind' in nature***.** The only communication between the testers and operators is to verify that parameters meet or exceed the previous month's average operating conditions. Boiler operators are not given long lead times by the source testers, in order that they may "tune-up" their boiler.

*Source tests are conducted at or above the previous month's average operating parameters***.** Source tests are designed to utilize operating conditions that best emulate past plant operating parameters in order to show continuous compliance. To accomplish this, source tests are conducted at or above the previous month's average operating standards in terms of both production rates and unit operating configurations. It is assumed that the greater the operating parameters, the greater the mass emissions. Thus, if the operating parameters exceed the previous month's averages and still meet standards, the overall assessment is that the source test was representative and the system was in continuous compliance.

*Additional surrogate monitoring parameters***.** In addition to direct source testing conducted periodically, which definitely determines compliance, Ecology has proposed minimum operating conditions in numerous air pollution control equipment as surrogate monitoring requirements intended to indicate compliance to achieve an overall monitoring program that meets the Title V requirement of “monitoring sufficient to assure compliance.”

Regulatory Orders

Copies of the state regulatory orders that impose limitations and requirements on the permittee are provided in Appendix F of the permit. The permittee is subject to regulatory orders. A majority of the most stringent emission limits for the facility are contained in these orders. These orders establish source specific limitations, but also include default limitations established by state regulations. These orders are not intended to be a separate legal source for default limitations that are based in state regulations. The limits derived directly from the state regulations that were included in these orders, therefore, are considered to be the "applicable requirement" for purposes of Title V. Consequently, the permit does not cite the orders as an applicable requirement for regulatory limits; for these limits, the permit cites only the regulation as the underlying applicable requirement.

Alternate Operating Scenarios

The permittee did not request any other alternate operating scenario and, therefore, WAC 173-401-650 becomes an inapplicable requirement.

MACT Standards

The permittee is regulated by the 40 CFR Part 63, "National Emission Standards for Hazardous Air Pollutants (NESHAPS) for Source Categories," The final NESHAPS for Printing was issued on May 30, 1996. The final NESHAPS for the Chemical Recovery – pulp and paper industry was issued on April 15, 1998. The proposed NESHAPS for the Chemical Recovery Combustion Sources was also issued on April 15, 1998. The Camas Mill is not impacted by the Printing MACT other than that Fort James was required to make an initial notification (accomplished with the submittal of the Air Operating Permit application on June 5, 1995), and the mill must keep the amount of total hazardous air pollutants in the printing operation to less than 400 kg per month or limit the total amount of material applied in printing to less than 500 kg per month. The permit requires that a monthly log be maintained, by May 1999, to track the printing chemicals applied. For the Chemical Recovery Sources the Camas Mill is required to be in compliance by April 16, 2001 except for the high volume low concentration (HVLC) sources which must be in compliance by April 16, 2006. Fort James' Combustion NESHAPS was proposed and is tentatively scheduled to be finalized in 1999.

In establishing the MACT floor for Combustion Sources, EPA views State of Washington Data as the better sets covering long-term particulate matter emissions (see the Preamble Federal Register Vol. 63, No. 72, Wednesday, April 15, 1998, Proposed Rules page 18769). In fact "the proposed MACT floor PM control technology for new NDCE kraft recovery furnaces includes both the ESP and the cross-flow, packed-bed scrubber, the scrubber was installed as a heat recovery device and for SO_2 control and is not expected to provide much, if any additional PM control." (See the Preamble page 18769). In fact, the Fort James Camas Mill generated this control technology and the data set.

Application

Ecology received a complete application prior to April 20, 1998. Therefore, the Compliance Assurance Monitoring (CAM) rule applies in the next permit cycle period, or upon the construction of a new source or the modification of an existing emission unit that requires a change in emission limitation and a re-opening of the air operating permit. Only the modified emission unit is subject to the rule.

Insignificant Emission Units

The facility-wide general requirements apply to the whole facility, including insignificant emission units and activities (IEUs), as required by the operating permit rule. The rule states, however, that IEUs are not subject to monitoring requirements unless the generally applicable requirements in the State Implementation Plan (SIP) impose them. [WAC 173-401-530(2)(c)]. The Washington SIP does not impose any specific monitoring-related requirements for the facility-wide requirements for IEUs at this source. The permit, therefore, does not require any testing, monitoring, reporting, or recordkeeping for insignificant emission units or activities.

AIR OPERATING PERMIT APPLICATION

On June 5, 1995, the Fort James (formerly the James River Corporation) Camas Mill submitted an application for an air operating permit under Title V of the Clean Air Act Amendments. Several process improvements and other procedural changes at the mill necessitated that the application be updated and a revised application was submitted on August 29, 1997. Some emission factors were also revised based on new information from NCASI and from independent emission stack testing contractors. In the permit application, Fort James provided the following “Facility Description.”

FACILITY DESCRIPTION

The Fort James Camas Mill is located on 661 acres; 185 acres are north of the Camas Slough, adjacent to the Columbia River in Clark County, Washington. It has occupied this site since 1883 when it was constructed to supply newsprint for the Portland area.

The mill currently produces over 600,000 tons per year of reprographic, tissue, toweling, communication papers, and a host of other grades and finished products. Raw materials in the form of wood chips, sawdust, waste paper, and pulp arrive from all over the Northwest by truck, barge, and rail car.

The Camas Mill uses both the kraft and magnesium bisulfite (MgO) processes to convert wood chips and sawdust into pulp. Brown pulp is then bleached in one of the three bleach plants. Most of the paper grades produced contain a blend of these pulps, as well as purchased pulp and secondary fiber recycled from waste paper.

Twelve (12) machines produce paper, half of them towel and tissue grades and the other half communication paper grades. The oldest dates from 1910 and the newest from 1984. Daily production ranges from 30 tons per day on the smallest to over 600 tons per day on the newest and largest. Rolls of paper from the machines are sold directly to printers and converters or further processed into finished goods. The mill also operates a pulp dryer to produce baled pulp for internal use or sale to outside customers.

Wastewater is treated and discharged to the main stem of the Columbia River. The primary clarifier, aerated stabilization basins, and the solid waste landfill are located on Lady Island, a 476-acre site separated from the main mill by the Camas Slough.

The Camas Mill employs about 1450 people from the local area. Most processes operate 24 hours a day, 7 days a week, and 52 weeks per year. Production equipment can be shut down for cleaning maintenance or to control output. The entire facility is shut down periodically for maintenance and cleaning.

Several other Fort James operations are located north of the mill site. These include Project Management and Engineering, Specialty Chemicals, Camas Business Center, and Corporate Environmental Services. Of these, only Specialty Chemicals was required under the CAA to obtain an operating permit. A permit has been issued by the Southwest Air Pollution Control Authority (SWAPCA) for the operations at Specialty Chemicals.

Specialty Minerals, Inc., leases property inside the northern boundaries of the Camas Mill site and operates a plant for the production of precipitated calcium carbonate. The Camas Mill supplies the plant with kiln flue gases, water, and sewer. The gases are stripped of their CO_2 and returned to the kiln stack. Neither Fort James Corporation nor the Camas Mill has any responsibility for the operation or permitting of this facility.

Pacific Power and Light, Burlington Northern Railroad, City of Camas, Washington State Department of Transportation, and others have right of way access through the Camas Mill site. In addition, the Camas Slough, a public waterway, passes through the site. Neither Fort James Corporation nor the Camas Mill has any responsibility for equipment or activities associated with these other parties.

PROCESS DETAILS

<u>Facility General</u>

* *Millwide processes including utilities, effluent treatment, transportation and fuels, roads, grounds, material handling between processes, construction, demolition, housekeeping, labs, offices, employee trips, etc.*

Water is supplied from wells, the Camas Slough, and a system of dams and ditches from Lacamas Creek. The City of Camas supplies potable water. Raw water is dosed with chlorine and polymers and is clarified. A portion is then filtered before distribution. Chlorine is supplied from one-ton cylinders.

Waste heat from some processes is used to produce warm or hot water. This is stored and distributed for use by other processes throughout the mill.

Electricity is purchased from Pacific Power and Light and Clark County Public Utilities. Air compressors are located at various sites throughout the mill and feed into a common distribution system.

Natural gas is used for area heating, paper drying, process heating, and steam generation. It is received via both a high-pressure line from Northwest Pipeline and low-pressure line from Northwest Natural Gas.

Neutral and alkaline process sewers are collected, screened, and pumped to a clarifier on Lady Island. Residual solids from the clarifier are thickened and burned in the wood waste boiler or conveyed to the landfill. An acid sewer runs by gravity under the slough to join the alkaline effluent from the clarifier. Urea ammonium nitrate (UAN) and phosphoric acid are then added as nutrients for biologic treatment. The combined effluent runs through an open ditch to two aerated stabilization basins (ASBs) in series. The treated effluent is discharged into the Columbia River.

Sanitary sewage is processed by the City of Camas.

Materials and goods are handled by conveyor, fork truck, tractor train, front-end loader, dump truck, and other vehicles. Raw materials and finished goods are shipped by rail, truck, and barge. Gasoline, diesel, LPG, and batteries are used to power vehicles.

Steam and Power Generation

* *One Woodwaste boiler and one fossil fuel boiler including feedwater processing.*
* *No. 6 fuel oil receiving, storage, distribution, and electric power generation.*

Steam is generated at 600 psi by burning natural gas, No. 6 fuel oil, hog fuel, or spent liquor from the pulping processes. It then passes through reducing valves to lower the pressure and is distributed within the mill as a source of heat and mechanical energy. Much of the condensed steam is returned to the boilers to conserve heat and demineralizing chemicals. Beginning in October of 1995, the steam flow was directed to a new turbine generator set. There the pressure drop generates electricity before distribution to production processes. Steam can be vented directly to the atmosphere to maintain uniform system pressure.

Wood waste is stored in an open pile. When needed, it is pushed to a reclaim pit by crawler tractor and then carried by belt conveyor to a live bottom hopper. The hopper screw meters the hog fuel into the boiler feed system.

The No. 6 fuel oil is received by barge and stored in a heated tank. Before use, it is transferred to a smaller day tank and then distributed to the boilers and lime kiln. The wood waste boiler burns hog fuel, residual solids from the primary clarifier, washed pulp mill rejects, and natural gas. Solid fuel is burned on floor grates. Cinders are returned to the firebox and fly ash is captured in an electrostatic precipitator (ESP). Bottom ash is sluiced, drained, and hauled off site where it is marketed as an agricultural lime substitute. Wood waste is fed to the boiler via the hog fuel system. Conventional burners are used for natural gas. The fossil fuel boiler burns natural gas or No. 6 fuel oil.

The new turbine generator replaces three smaller units that were shut down prior to start of construction. The output is sold to a utility company.

Wood Processing

* *Wood receiving and processing.*
* *Wood chip receiving, storage, handling, screening, and delivery.*
* *Sawdust receiving, storage, handling, screening, and delivery.*
* *Hog fuel receiving, storage, handling, and delivery.*

Wood chips, sawdust, and hog fuel are received by barge or truck. Chips also come in by rail. Handling is by bucket, drag chain, belt conveyor, airveyor, or crawler tractor. Site storage is in open piles or chips can be stored in closed silos. No chips are currently produced on site.

Crawler tractors are used to reclaim chips from pile storage. Turntables meter chips from the silos. Wood is then screened and accepts conveyed by belt to the digesters. Oversized wood can be rechipped. Fine material may go the digesters, sawdust system, or be sold. Knots and gross oversized material becomes hog fuel.

Sawdust is reclaimed by crawler tractor, screened, and blown to a cyclone separator above the sawdust digester silo.

Hog fuel is pushed to a reclaim pit by crawler tractor and then carried by belt conveyor to a live bottom hopper. Hog fuel is sometimes stored at a permitted site on Lady Island and moved to the mill by truck as it is needed.

MgO Operation

* *MgO sulfite continuous pulping: pulp washing, screening, and storage.*
* *Chemical recovery system including evaporators, concentrators, furnace, and acid making.*

Magnefite is an acid pulping process based on magnesium bisulfite as the cooking chemical. Wood chips are delivered by belt conveyor to a Kamyr two-vessel continuous digester. The cooked chips are blown to a diffusion washer and then discharged to a storage chest. The washed pulp is then knotted, screened, and cleaned before storage and bleaching. Digester and evaporator system emissions are incinerated in the MgO recovery furnace. Chip bin, diffusion washer, and decker emissions are vented to the atmosphere.

Spent chemicals and dissolved organics from pulp washing (red liquor) are stored and then thickened in a multiple effect evaporator and concentrator system. The concentrated red liquor is fired into a recovery furnace where organics and sulfur are combusted and magnesium oxide (MgO) is collected as a powder. The MgO is slaked with water (into MgOH), recombined with sulfur dioxide (SO_2) in the flue gases, and then fortified with additional SO_2 in a separate tower to produce fresh cooking acid for the pulping process. A four-stage venturi scrubber and a packed bed caustic scrubber remove SO_2 and particulate from flue gases before discharge through a stack.

Some chemical makeup is required to sustain the process. MgOH is added as a slurry and molten sulfur is burned to produce SO_2 for this process and also to quench excess ClO_2 in the bleaching processes.

The MgO recovery furnace can also be fired with natural gas or No. 6 fuel oil.

Kraft Recovery

* *Three kraft multiple effect evaporator sets.*
* *One blow heat evaporator.*
* *Three kraft liquor concentrators.*
* *Two kraft chemical recovery furnaces.*

Weak black liquor washed out of kraft batch and sawdust pulps is thickened to about 50% solids in one of three multiple effect evaporator sets or a blow heat evaporator. It then goes to one of three concentrators to raise the solids to 70% where it can be burned in the recovery furnaces. Black liquor is stored in tanks between each step of the process.

Kraft noncondensible gases from the evaporators and concentrator are incinerated in the MgO furnace with the lime kiln as a backup. Contaminated condensates are reused at the washers. Foul condensates go to the process sewer.

Two recovery furnaces are available to burn the concentrated black liquor. Heat is released to generate steam and a smelt of mostly inorganic chemicals drains from the bottom of the furnace into an agitated tank. There it is dissolved in wash filtrate (weak wash) from the recaust and kiln process to form a solution of sodium carbonate and sodium sulfide (green liquor). The dissolver vent gases pass through a packed bed caustic scrubber before discharge. Particulate entrained in the flue gases is captured in a precipitator and mixed with the black liquor going to the furnace. A caustic scrubber then removes most remaining particulate and absorbs most of the sulfur dioxide. Gases finally pass through a wet heat recovery system before release through a stack to the atmosphere.

The green liquor is pumped from the dissolving tanks to the recaust and kiln process. Steam and gases released in the tanks pass through wet caustic scrubbers before release to the atmosphere.

Both kraft recovery furnaces can burn natural gas or No. 6 fuel oil as an auxiliary fuel.

Recaust and Kiln

* *Recausticizing and lime kiln area.*

The recausticizing and lime recovery phase of the kraft process has the primary purpose of taking spent pulping chemicals from the recovery process and regenerating them into active alkaline cooking liquor. Clarified green liquor (sodium carbonate and sodium sulfide) is mixed in a slaker with hot lime (calcium oxide) from the kiln or fresh lime delivered by truck. Calcium carbonate then settles out as a sludge in the white liquor clarifiers. White liquor (sodium hydroxide and sodium sulfide) can then be used in the kraft batch or sawdust pulping processes and the lime sludge is washed, filtered, and calcined in a kiln to be reused in the recausticizing process.

The kiln is fired with natural gas or No. 6 fuel oil. It also can incinerate NCG's (as a backup) from the kraft pulping and recovery processes. Flue gases from the kiln pass through a wet scrubber to remove particulate and most of the sulfur dioxide.

Kraft Batch Pulping

* *Kraft batch cooking, washing, screening, pulping storage, and heat recovery.*

Kraft cooking begins when wood chips are mixed with an alkaline solution and reacted at high pressure and temperature in a vessel called a digester. Belt conveyors deliver chips to the 13 kraft batch digesters at the Camas Mill. The filling process is augmented by an exhaust system which draws air from the digesters and expels it to the atmosphere through a cyclone which removes entrained particulate. Digesters are filled with a mixture of white and black liquor, then closed and heated. Noncondensible gases are vented through a turpentine recovery system to the kraft NCG system for incineration in the MgO recovery furnace or to the kiln (as a backup). After sufficient time and temperature, the cooked chips are blown into one of three blow tanks.

The blot tanks feed two washing and cleaning systems. Pulp (brown stock) is first pumped through knotters to remove pieces of uncooked wood (knots). It then passes over drum washers to remove spent cooking chemicals and dissolved organics (weak black liquor). It then goes to storage. From storage it goes to screening and cleaning ahead of the bleaching process. Emissions from the brown stock washers and their associated equipment are discharged to the atmosphere. Knots are returned to the digesters.

Kraft Sawdust Pulping

* *Kraft sawdust continuous cooking.*

Sawdust is blown to a storage silo after screening. Two continuous kraft process digesters feed from the silo and then discharge to a single blow tank. Sawdust pulp is blended with chip pulps prior to washing and bleaching. All chemical systems are common with kraft chip pulping.

Heat is recovered from blow gases, and the NCG portion is incinerated.

Pulp Bleaching

* *Two kraft bleach plants.*
* *One MgO sulfur bleach plant.*
* *Bleach chemical preparation and slush pulp storage.*

Brown pulps are sent to one of three bleach plants. One is a kamyr displacement system and the other two are conventional bleach plants with reaction towers and drum washers. Chlorine, chlorine dioxide, caustic (NaOH), oxygen, and hydrogen peroxide are used in the bleaching process. Sodium hypochlorite is used in the bleaching of sulfite pulp (also chlorine, caustic and chlorine dioxide). For the displacement system, the chlorine dioxide vent is scrubbed in a new white liquor scrubber. For the other two conventional plants, all chlorine stage vents are scrubbed with caustic and all chlorine dioxide vents are scrubbed in a new white liquor scrubber. A water solution of sulfur dioxide is used at the end of the bleaching process as an anti-chlor (reduces residual chlorine dioxide to salt).

Chlorine is delivered by rail. Caustic, sodium chlorate, methanol, and other chemicals arrive by truck. ClO_2, sodium hypochlorite, and sulfur dioxide are produced on site. Chlorine dioxide is produced by either the Lurgi or ERCO R-8 process. All chlorine containing emission points and the ERCO R-8 process vent are scrubbed in the new white liquor scrubber.

Bleached pulp is stored in large tanks before delivery to the paper machines or pulp dryer.

Papermaking and Pulp Drying

* *Twelve paper machines.*
* *Pulp storage.*
* *Repulp.*
* *Mixing and distribution.*
* *Pulp drying, sheeting and baling.*

Camas has 12 paper machines and one pulp dryer. Furnish for these machines comes from internal pulp, purchased pulp, internal broke (paper waste), or purchased waste paper. These are mixed with additives such as clays, fillers, starches, retention aids, dyes, and other chemicals to make a wide variety of papers. Furnish for the pulp dryer is internal pulp with few or no additives. Heat for paper drying comes from steam or natural gas combustion. The paper machine rooms are equipped with roof sweeps to expel excess moisture.

The machines produce paper in large rolls which can be used in the print, business paper finishing, and towel and tissue converting processes, shipped to another Fort

James facility, or be sold to an outside customer. The pulp dryer produces baled pulp for internal use or sale to outside customers.

Print

* *Printing and sheeting or rewinding to produce finished or semi-finished products*

Camas has a small printing operation for internal use, as well as production of some finished products. Inks used are water, glycol, or oil based. Water based inks penetrate paper quickly and dry quickly. Glycol and oil based inks are slow drying. All have low VOC contents. Some solvents are used for press cleanup. The process area is exhausted directly to the atmosphere through roof vents.

Business Paper Finishing and Towel and Tissue Converting

* *Sheeting or rewinding to produce finished or semi-finished paper products.*
* *Converting jumbo paper rolls to finished sanitary paper products including roll and folded towels and tissue.*

This process uses rolls of paper from the machines to produce sheet products or smaller rolls. There may be printed, used internally, or sold directly as a finished product. Two large sheeters produce paper for copies, printers, etc. Specialized folders and rewinders manufacture towel and tissue.

Maintenance Areas

* *Maintenance activities for all processes including maintenance shops.*
* *Equipment structure and building repairs.*
* *Demolition.*
* *Painting.*
* *Road and grounds maintenance, etc.*

Maintenance activities include equipment and facility inspections, upkeep, repairs, demolition and minor modifications. Asbestos upkeep and removal is also included in this process. To support these activities are shops, tools, painting facilities, cold degreasers, sandblasting equipment, and other facilities and equipment.

Persons conducting these activities may be Fort James employees, contractors, or other interested parties such as owners of rented equipment or their agents.

HISTORICAL PERSPECTIVE

In 1883, in the name of the Columbia River Paper Company, Henry Pittock, publisher of the Oregonian in Portland, Oregon, and William Lewthwaite started the first paper mill in Washington at a town site laid out by the company at LaCamas, Washington. The mill was designed initially to produce four tons of paper a day. Its first production consisted of newsprint, manilas and straw paper from groundwood pulp, as well as straw and rag pulp. A Capsule History of the Camas Mill is enclosed as Attachment A. Some of the important milestones include:

1. A chemical sulfite mill was constructed in 1888. Sulfite pulp production was expanded in 1907 and 1910.
2. The first sulfite mill bleach plant was installed in 1924.
3. In 1926, the first kraft mill was constructed and started up.
4. In 1946-1948, the kraft mill production was increased and a kraft bleach plant was added.
5. In 1955-1957, a new kraft recovery furnace, a new lime kiln, eight digesters, and a new kraft bleach plant were constructed.
6. In 1968, a primary clarifier was constructed to treat and control the wastewater discharge to the Columbia River.
7. In 1971, the calcium sulfite process was replaced with the magnefite sulfite process so that chemical recovery of the pulping liquors could occur.
8. In 1975, a new kraft recovery furnace and secondary wastewater treatment system were constructed and placed into operation.
9. In 1979, a new lime kiln was constructed to replace two outdated kilns.
10. A $425 million modernization of the Camas Mill was completed from 1981-1984. The project included an 800-ton per day kraft bleach plant, modernization of the two other bleach plants, a new kamyr continuous sulfite digester, new pulp washing and screening systems, and a new 160,000-ton per year business paper machine. Modernization of the bleach plants included construction of a chlorine dioxide generator and installation of scrubber systems on each bleach plant.
11. In 1992, the mill completed an $80 million energy and recovery modernization designed to increase energy efficiencies and reduce air emissions.
12. In 1996, chlorine dioxide production was increased and each bleach plant scrubber system were modernized or replaced to utilize white liquor as the scrubbing media. These systems are considered to be “best available technology” for controlling bleach plant emissions.

Steady investment in the mill has changed the character of the mill from producing 4 tons per day of paper to over 1600 tons per day. The products the mill makes also have changed throughout the history of the mill. Today, production consists of towel and tissue products, business papers, and specialty paper products. Since the late 1960's and early 1970's, environmental impacts have been an important consideration when the Camas mill has expanded or modernized.

Based on economic conditions, the mill has invested in processes and environmental controls that have improved the ambient air quality in the Camas/Vancouver/Portland air shed dramatically. A review of ambient air quality trend data reveals that, in particular, sulfur dioxide and particulate ambient levels have been reduced considerably. Sulfur dioxide and particulate ambient air standards were exceeded in the early 1970's. Maximum impact locations are now significantly below EPA and State of Washington ambient air quality standards. Some examples of the reductions in air emissions that have occurred over the years are as follows:

1. Chart showing particulate reductions. (See Appendix C)
2. Chart showing sulfur dioxide, $SO_{2,}$ reductions. (See Appendix C)
3. Chart showing total reduced sulfur compounds and TRS reductions. (See Appendix C)

The land use patterns around the mill have changed significantly in the past ten years. What was once a paper mill town has developed into a bedroom community of the Vancouver/Portland metropolitan area. New businesses have located in the Camas – Clark County area adding to the tax base and increasing residential growth and development.

One concern of the various business and residential neighbors is the odor situation around the mill. The chemical pulping processes, while very efficient at recovering pulping chemicals, unfortunately produce sulfur compounds that are very sensitive to the human nose at extremely low concentrations. Fort James was required to do an Odor Survey in 1995 to determine the various sources of these odors. This survey revealed that the mill had accomplished significant progress in controlling the various air emission sources. The major air emission units such as the kraft recovery furnaces, smelt dissolvers, magnefite furnace, and lime kiln are well controlled and have continuous emissions monitors to record and monitor the emissions. The survey revealed that currently over 90% of the total reduced sulfur compounds are emitted from the wastewater treatment aerated basins. Other sources include vents in the pulping process area of the mill.

In 1996, Fort James submitted a Technology Review of the methods to control the emissions from the wastewater treatment system. At that time, the methods providing for the best removal of TRS compounds from the wastewater were either air or steam stripping systems that removed the compounds from the wastewater prior to the effluent being discharged to the mill sewer system.

At that time the U.S. Environmental Protection was in its 5th year of reviewing the pulp and paper industry's environmental regulations, including air and water standards. Since part of the EPA regulations were to cover pulping and bleaching areas, Fort James requested, and the Washington Department of Ecology granted a request to delay implementation of a detailed engineering solution to the wastewater treatment plant odor problem. EPA finally completed its review and published the final regulations on April 15, 1998.

The combined air and water “Cluster Rule” for the pulp and paper industry will protect human health and the environment by reducing toxic pollutant releases to both air and water. Air emissions that will be reduced include toxic air pollutants, total reduced sulfur (odor), volatile organic compounds, and particulate matter. EPA’s rule requires that those controls be placed into operation by April 16, 2001, and that high volume low concentration gas controls be operating by April 16, 2006. Fort James has agreed to implement the foul condensate steam-stripping project for controlling the wastewater treatment basin emissions on a schedule to complete construction by December 1999 and demonstrate compliance by July 2000. This particular project will have the most significant impact to the surrounding community. A Notice of Construction for the “Foul Condensate Stripping System” was submitted on November 9, 1998.

Other Cluster Rule projects include fiber line changes for the three pulping and bleaching systems at Camas. These process changes will be phased projects. Tentatively construction is scheduled to start in June 1999 with completion of the last fiber line change by November 2000 so that compliance can be demonstrated by April 16, 2001. Control of the pulping/bleaching, high volume, low concentration sources will be accomplished by November 2005 with compliance demonstrated by April 16, 2006. Control over these sources will continue to show reductions of the total reduced sulfur (odor) compounds; however, the most dramatic reductions will occur with the wastewater treatment basin emission controls which represent at least 90% of the current TRS emissions from the mill.

EPA Region X Multi-Media Inspection in June 1994
Air Operating Permit Application Findings
Consent Decree filed July 1997

EPA Region X Multi-Media Inspection

On June 13 to June 16, 1994 the US Environmental Protection Agency accompanied by representative from the Department conducted a multi-media environmental inspection of the Fort James Camas Mill. A detail review was undertaken of the production changes that occurred at the Camas Mill going back several decades to assure that the mill had complied with regulatory requirements especially under Prevention of Significant Deterioration (PSD), New Source Review (NSR), New Source Performance Standards (NSPS), and Notice of Construction. The monitoring and reporting requirements and the parameters that were selected to be monitored to demonstrate continuous compliance with particulate and opacity limits were reviewed by both the Department and EPA Region X. This review involved numerous representatives from the Department and EPA regional and headquarters representatives. Fort James supplied almost 4 file drawers of historical monitoring and reporting data as well as submittals made to the Department and EPA Region X from the early 1970's to 1994.

Most of the changes that occurred at the mill happened during two distinct periods. The first period was the 1981 to 1984 Kraft Mill Modernization project. The modernization allowed the Camas Mill to reduce the mill's TRS emissions by 80%. As part of the modernization, the No. 4 Kraft Recovery Furnace was converted to a noncontact design and a new brown stock washer line and a new evaporator/concentrator was added. The changes to the recovery furnace were not subject to the NSPS for kraft recovery furnaces Subpart BB. For technological and economic reasons, the Department granted an exemption from the NSPS requirement for the brown stock washer line. EPA reviewed this exemption in detail during the 1994 multi-media inspection. In the letter dated May 31, 1996 in Appendix D, EPA concluded "It has been demonstrated to the satisfaction of the Administrator that, based on the cost analysis provided to EPA by Fort James, incineration of the brown stock washer gases is technically feasible but economically infeasible at this time. Therefore, Fort James is not required to control emissions of total reduced sulfur, TRS, to meet the 5 ppm limit or incinerate brown stock washer gases, as provided in 40 CFR 60.283."

Although a performance test was conducted on the brown stock washer vent, EPA required that a second performance test be conducted. A sampling Plan was submitted on July 31, 1996. On September 11, 1996 Fort James conducted the source test for TRS on the brown stock wash line and submitted the results by letter dated October 23, 1996.

The second period that significant changes occurred at the mill was from 1989 to 1992. The main elements of the Energy and Recovery Modernization project was rebuilding the No. 3 Kraft Recovery Furnace, converting the No. 3 Power Boiler from oil to wood burning, decommissioning the No. 1 and No. 2 Power Boilers, and adding a scrubber to the Magnefite Recovery Furnace. EPA and the Department jointly reviewed the project and issued a combined Prevention of Significant Deterioration Determination and Notice of Construction approval. This project allowed the mill to increase $NO_{X,}$ VOC, CO and TRS emissions. VOC emissions were offset by comparable reductions within the area. These reductions were obtained from the Southwest Air Pollution Control Authority. Particulate and SO_2 emissions were substantially reduced. Emission Reduction Credits were obtained for the SO_2 emission reductions. Under the PSD permit, Fort James is subject to emission limits and monitoring requirements that either match or exceed the limits and requirements imposed by the Kraft Pulp Mill NSPS. These limits are discussed under the Major Emission Units section.

During the Multi-Media Inspection, the air emission monitoring plan for the Fort James Camas Mill was reviewed in detail including each of the Continuous Emission Monitors and the Quality Assurance Quality Control Plans that had been developed for each type of monitor. Fort James recently upgraded their CEMs to assure that this equipment is able to meet the uptime requirements for these types of monitoring equipment. A review of the emission studies and pollution control device parameters that are measured and either reported or kept in operating logs was also conducted. Fort James had prepared the "Camas Mill Air Emission Monitoring Plan" in 1990 to reflect all of the monitoring and reporting requirements that were included in the various regulatory orders. As a result of the Multimedia Inspection Fort James was requested to update this plan to reflect the emission studies had been accomplished in 1991 to 1993. A revised, "Camas Mill Air Emission Monitoring Plan", was prepared and submitted in February 1995. The Department and Region X EPA agreed with the parameters selected as meaningful parameters and were in agreement with the studies that were presented in the early 1990's. This plan has been revised and updated several times to reflect changing conditions. The latest plan revision is dated October 1998. The correspondence covering the emission studies with the submittal dates are referenced in the Camas Mill Air Emission Monitoring Plan (see Appendix D).

<u>Air Operating Permit Application Findings and Consent Decree:</u>

Fort James Camas Mill conducted sampling and testing of individual emission units. This testing revealed that during the Energy and Recovery Modernization Project that the Sulfur Dioxide limit for the No. 3 Power Boiler did not correctly account for the sulfur content of the hog fuel, primary sludge, and natural gas. In addition, testing revealed that VOCs were being emitted from the Smelt Dissolvers. A request to revise the Prevention of Significant Deterioration (PSD) and Notice of Construction (NOC) was made to the Department and correspondence between the Department and Fort James has gone back and forth with the final necessary information sent to the Department on July 29, 1997. Offsets were obtained for the VOC emissions and Emission Reduction Credits were utilized for the sulfur dioxide emissions. The Department issued a revised PSD/NOC on September 1998.

During the preparation of the Air Operating Permit Fort James was required to perform a compliance review on all its emission units. Fort James discovered several emission problems and worked with the Department on a plan to correct each problem. A Consent Decree was negotiated between the Department and Fort James with review and comment by EPA Region X. The Consent Decree outlines the projects and schedule for bringing the mill into compliance with its emission limits. These air pollution exceedances occurred in different process areas of the mill; however, the predominate area was the bleach plants. Based on these emissions and in anticipation of the EPA cluster rules, the mill upgraded the collection and scrubber capability to utilize white liquor as the scrubbing agent to prevent chlorine and chlorine dioxide emissions. These bleach plant modernization's were made in late 1996 and in mid 1997.

Because of the chlorine releases that occurred in 1994 and 1995 the Department ordered Fort James to employ an outside independent consultant to review its chlorine handling and processing procedures. The consultant made recommendations that were implemented by the Camas Mill on a schedule approved by the Department.

Beside improvements at the bleach plants and chlorine handling and chlorine process areas, the Consent Decree included the following requirements:

1. Completed construction to route NCGs to the Magnefite Recovery Furnace from No. 3 Power Boiler on October 31, 1996
2. Submitted offsets for VOCs for the No. 3 and No. 4 Smelt Dissolvers on July 29, 1997.
3. Submitted inspection, cleaning, and maintenance programs for scrubbers.
4. Backup power to the Lurgi Process was provided by October 31, 1996.
5. Payment of a monetary penalty of $82,357 over the penalties previously applied.
6. Under the provisions of an innovative settlement agreement the mill was obligated to provide emergency communication equipment for the City of Camas and the mill emergency response team. The equipment was installed on September16, 1997, at a cost of $118,564.55. This exceeded the consent decree commitment of $114,100.

<u>Comments on Specific Permit Conditions</u>

Throughout this support document, an asterisk (*) signifies that frequencies specified as "monthly" may be changed to "quarterly," if permit conditions specified in the permit are met.

The permittee is required to verify compliance with the numerous mass loading standards per unit of time at a required frequency as specified in the permit.

As an example, Order DE-88-360-Modification 2 and PSD-88-3 Modification 2 limit particulate matter emissions from the No. 3 and No. 4 Kraft Recovery Furnace to 328 tons per year. There is more than one way to estimate the mass loading limit, including but not limited to the utilization of actual emissions factors from the numerous stack test results which were conducted over a long period of time. The other methods include the use of EPA's AP-42 Manual, or the data collected from continuous emission monitoring systems (CEMS) in addition to other certified data such as stack flow rate from the EPA Reference methods. The permittee will choose the most reliable and economically reasonable method to verify compliance with the applicable requirements. However, a method may provide a good estimation until an emission unit is modified, or there is a change in the method of operation. The permittee as the consequence may choose another method giving a more reliable and accurate estimation. In this following section, Ecology lists a recommended method to calculate the limit realizing that there may be other ways; therefore, during the course of the permit cycle, the permittee will advise the Department when another method is selected. Ecology's review and approval are required when the new estimation method is proposed by the permittee prior to utilization of the new calculation method.

MAJOR EMISSION UNITS

NO. 3 RECOVERY FURNACE
Condition A

Major Changes that Affected Emissions

The No. 3 recovery furnace was completely rebuilt in 1991. A new two-chamber, three-field electrostatic precipitator (ESP) and a packed bed, cross-flow scrubber replaced the old two-chamber, three-field ESP and venturi and Teller scrubbers. The rebuild improved the efficiency of the unit and reduced emissions of particulate matter, sulfur dioxide, and odor (TRS). The performance testing required by Regulatory Order DE-88-360, approval condition #34, was conducted during the period July 30 to August 3, 1990. The results of the testing are summarized in an August 20, 1991 letter to the Department.

Conditions A.1 and A.2 - Opacity and Particulate Limits

New source performance standards (NSPS) for kraft recovery furnaces limit particulate emissions to 0.044 grains per dry standard cubic foot (gr/DSCF). Ecology has concluded that BACT rules restrict PM_{10} emissions from this furnace to 0.033 gr/DSCF corrected to 8% oxygen. Monthly particulate source testing (EPA Method 5) has been imposed on the furnace stack through orders for controlling emissions. It is assumed that 100% of the particulate measured by the method is PM_{10}. The furnace has complied with the emission limit every month since 1993. Ecology considers that the monthly particulate test frequency is sufficient to indicate continuous compliance.

Although there is only a small probability that the recovery furnace would be out of compliance between monthly stack tests, minimum operational conditions are placed in the permit to show that the scrubber is operating. The scrubbing liquid must be monitored continuously. The hourly averages of the pressure drop through the scrubber will be at least 2 inches of water and the flow rate through the first stage of the scrubber will be at least 1900 gallons per minute. Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

The NSPS for a kraft recovery furnace restrict visual emissions to 35% opacity at the stack. Ecology has determined that visual emissions will be limited to 20% opacity at the No. 3 recovery furnace. Because the stack plume is wet, an opacity monitor will not work. Therefore, continuous minimum operational parameters for opacity monitoring were placed in the regulatory order [WAC 173-405-072(3)(b)]. The agreed to parameters are the same as the minimum operating conditions as described above for particulate. Method 9 opacity readings may be used if the minimum operational parameter is out of the prescribed operating value. This will override the minimum operational parameter results or the permittee must bring the system back into the prescribed minimum operating value within 24 hours.

Condition A.3 - Sulfur Dioxide Limit

Ecology currently restricts SO_2 emissions from kraft recovery furnaces to 500 ppm corrected to 8% oxygen. Ecology has determined that BACT for this furnace limits sulfur dioxide emissions to 10 ppm corrected to 8% oxygen on a 24-hour average. Determination of compliance is conducted via a monthly test using a TRS continuous emission monitor (CEM) (EPA Method 6C). The furnace has met the limit every month since 1993. Ecology considers the monthly sulfur dioxide test frequency sufficient to indicate continuous compliance.

Although there is only a small probability that the recovery furnace would be out of compliance between monthly tests, a minimum operational condition is placed in the permit to show that the scrubber is operating. The pH of the scrubber liquor is continuously monitored to assure a pH reading above 7. Records of the hourly average pH will be maintained. Whenever the hourly average pH is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported monthly.

Condition A.4 - Nitrogen Oxides Limit

The oxidation/reduction reactions that occur in a black liquor recovery furnace tend to generate less nitrogen oxides (NO_x) emissions than most other large combustion devices. Because of the design of the furnace, Ecology has determined that post-combustion controls are not required as BACT. The No. 3 recovery furnace is limited to a NO_x emission rate of 1.3 lbs/ton black liquor solids (BLS). Previous stack tests have demonstrated compliance with this limit.

Ecology provides the following discussion in response to the EPA Region X comment regarding the compliance demonstration at the No. 3 Kraft Recovery Furnace. In EPA's view, this comment is directed towards the lack of a factual basis to support using an emission factor from a previous source test to represent NO_x emissions under the anticipated range of operations.

a) NO_x Emission Invariability and Control

The following paragraphs provide a discussion to clarify Ecology's determination that results from the initial performance test and recent source tests can be used in a calculation algorithm to demonstrate compliance with NO_x emission standards for the kraft recovery furnaces.

- Studies by the National Council for Air and Stream Improvement (NCASI 1992) have shown that NO_x emissions from kraft recovery furnace have very stable characteristics which do not fluctuate significantly with the variability of the furnace operation. The NCASI report contained long-term continuous emissions monitoring data for NO_x emissions from several recovery furnaces. These data showed the NOx emissions fell within a narrow range for each furnace, in spite of significant day-to-day changes in furnace operation.

- In a summary assessment of control technologies for reducing nitrogen oxide emissions from non-utility point sources and major area sources (EPA, 1998), the EPA states: "NO_x emissions from recovery furnaces do not result from thermal oxidation of nitrogen in the air. Oxidation of fuel nitrogen, which appears to be the dominant mechanism for recovery furnace NO_x formation, can be sensitive to furnace temperature, however. Changes in the combustion process, such as low excess air and air staging, may reduce NO_x emissions in some cases." The detailed investigation into the origins of kraft recovery furnace NO_x emissions and related parameters by NCASI has indicated that stage air combustion is perhaps the best strategy for minimizing NOx formation in the furnace. Both kraft recovery furnaces are designed with staged air combustion.

- The NCASI report concluded that temperatures in lower spent-liquor fired furnaces like the Nos. 3 and 4 furnaces are probably too low to result in thermal NOx formation. The highest temperatures measured in recovery furnaces in this study, usually in the lower furnace region, range from about 1800 to 2400°F. These are much lower than needed for appreciable NOx formation by thermal NOx pathway (greater than 2800°F).

b) <u>Source Tests and Compliance Determination</u>

Source Tests and Related Data:

The PSD Permit No. PSD 88-3 required initial performance tests at the kraft recovery furnaces. These tests and recent additional source tests demonstrate compliance with NO_x emission limits. The test result summary is displayed below.

No. 3 Kraft Recovery Furnace – NOx Source Test Summary

Condition A.4 Permit Limit = 1.3 lb. NOx/ton of black liquor solid fired

Date	Liquor Firing Rate, gpm	NOx conc. ppm	NOx Emis. Rate, Lb. / hr.	NOx Emis. Rate, lb./TBLS
12-10-97	160	58	39.4	1.03
12-10-97	160	59	35.5	0.93
12-10-97	160	59	35.5	0.93
12-10-97	160	60	37.1	0.97
02-06-95	130	58	29.7	0.96
02-06-95	130	59	29.1	0.94
02-06-95	130	63	29.7	0.96

08-03-90	140	62	32.9	0.99
08-03-90	140	61	33.0	0.99
08-03-90	140	54	29.4	0.88

No. 4 Kraft Recovery Furnace – NOx Source Test Summary

Condition B.4 Permit Limit = 1.5 lb. NOx/ton of black liquor solid fired

Date	Liquor Firing Rate, gpm	NOx conc. ppm	NOx Emis. Rate, lb. / hr.	NOx Emis. Rate, lb./TBLS
02-08-95	220	68	57.9	1.11
02-08-95	220	64	58.5	1.12
02-08-95	220	68	63.3	1.21
09-25-90	225	66	75.8	1.41
09-25-90	225	64	73.4	1.37
09-25-90	225	60	69.9	1.30

The liquor firing rates achieved while the source tests were conducted are compared to average liquor firing rates in the table below:

Calendar Year - 1999	No. 3 Recovery Furnace, Period Average, Liquor Firing Rate, gpm	No. 4 Recovery Furnace, Period Average, Liquor Firing Rate, gpm
Period		
1	151	187
2	146	192
3	155	177
4	141	197
5	140	134
6	145	195
7	143	184
8	101	208
9	135	170
10	125	158
11	158	176
12	142	192
Source Test		
12/10/97	160	
02/06/95	130	
08/03/90	140	
02/08/95		220
09/25/90		225

Ecology's experience shows that using the results from source tests conducted at a higher level than the representative average condition, yields results that overstate actual emissions. The emission factor developed from these source tests will yield a conservative estimate of NO_x emissions and should give a significant margin to assure a compliance of the NOx standard in either per ton of black liquor solids or tons per year. This experience can be substantiated using the actual NOx emissions measured by a continuous emissions monitoring system (CEMS) and compared to those that are calculated using the source test results at the No. 3 Power Boiler as below:

- The initial performance test for the No. 3 Power Boiler was conducted on June 16, June 18, and July 18, 1992. Fort James submitted the test results to Ecology on July 21, 1992. The NO_x emission test results are displayed in Table 1.

Table 1. NO_x Emission Summary No. 3 Power Boiler Initial Performance Test Results.

Pollutant	Short Term Permit Limit	Long Term Permit Limit	Short Term Measured Emissions	Long Term Measured Emissions
NO_x	0.25 lb/10^6 BTU	433 Tons	0.21 lb/10^6 BTU	302 Tons

- Using the above data to calculate annual NO_x emissions and comparing these results with the CEM data, annual emission calculations reveal the following:

Pollutant	1994	1995	1996	1997	1998
NO_x (using actual CEM data and as reported in Annual Emission Inventory)	130 TPY 0.16 lb/ 10^6 BTU	104 0.17 lb/ 10^6 BTU	148 0.16 lb/ 10^6 BTU	128 0.11 lb/ 10^6 BTU	140 0.16 lb/ 10^6 BTU
NO_x (using emission factor determined from initial performance test)	171 0.21 lb/ 10^6 BTU	125 0.21 lb/ 10^6 BTU	195 0.21 lb/ 10^6 BTU	244 0.21 lb/ 10^6 BTU	184 0.21 lb/ 10^6 BTU

The annual NO_x emissions were calculated according to the algorithm specified in the Air Operating Permit. The following table shows NO_x emissions using the emission factor.

	NOx (Tons per year)			
Year	No. 3 RF	No. 4 RF	Bubble No. 3 & 4 RF*	Bubble Limit
1994	166	218	385	609
1995	160	188	348	609
1996	186	193	379	609
1997	216	204	420	609
1998	147	263	395	609

* Based on Data Monitoring Report to Ecology

Briefly, source tests conducted by Horizon Engineering in 1990, 1995, and 1997 demonstrated that the recovery furnaces met the NO_x limits specified in Conditions A.4 and B.4. Section a) of this discussion has already provided a factual basis explaining why NO_x emission factors developed from the source tests will not change due to day-to-day changes in furnace operation. Based on the information presented in Sections a) and b) and professional experience of kraft recovery furnace operation, Ecology determines that the emission factors are representative of NOx emissions from these furnaces and periodic monitoring and testing for Condition A.4 and B.4 are not required.

c) Calculation Frequency for NOx Emissions

According to Condition C.3 of the Air Operating Permit, Fort James is required to calculate NO_x emissions in tons per year on a monthly basis using the emission factor developed as instructed in Condition A.4 and B.4 of the permit. Condition C.3 states further: "Calculate cumulative mass emissions monthly; report progress toward the annual limit in each monthly report." The calculations have been reported to Ecology monthly since the PSD permit was issued.

d) Inclusion of NO_x Equation in the Permit

Condition C.3 requires Fort James to calculate NO_x emissions on a monthly basis. The algorithm below is used to calculate annual NO_x emissions. It is located in Appendix C of the permit.

NO_x (mass per time) = Emission Factor * Fuel Consumption (or Material Produced)

The emission factor assumes that the stack gas exhausts under ambient conditions (it does) and that the stack gas temperature is greater than the critical temperature. According to the Handbook of Chemistry and Physics, 51st Edition, 1970-1971, critical temperature is defined as a temperature which a gas cannot be liquefied by pressure alone. The exhaust gas at the recovery furnaces is measured in the range of 120°F to 130°F which is well above the critical temperature. Therefore, it is obvious that the exhaust gas should behave like an ideal gas and thus obey the ideal gas formula:

$$p\dot{V} = \frac{\dot{m}}{MW} R^{*} T$$

From this equation the emission factor can be found as follows:

$$\dot{m}_{NOx} = \frac{60 \times c \times p \times \dot{V} \times MW}{10^{6} \times R^{*} \times T}$$

Where

60	Time conversion, 60 min/hr
c	Concentration of NO_x measured, ppm
10^6	ppm conversion factor
P	Pressure of exhaust gas, psf
V	Flow rate of exhaust gas, dscf
MW	NO_x molecular weight
R^*	Universal gas constant, 1545.33 ft.lbs/lbm.°R
T	Temperature of exhaust gas, degree Rankine
m	NO_x emission in pound per minute

As an example, the NO_x source test data conducted at Fort James using EPA Method 7E on December 10, 1997 by Horizon Engineering yielded:

p	=	14.69 psi
V	=	84558 dscf (average of three tests)
MW	=	46 lbm/lbmole
T	=	527.67°R

$$\dot{m}_{NOx} = \frac{60\frac{min}{hr} \times 59.5\,ppmv \times 14.69\frac{lbf}{in^2} \times 144\frac{in^2}{ft^2} \times 84{,}558\frac{ft^3}{min}}{10^6 \times 1{,}545.33\frac{ft.lbf}{lbm.^oR} \times 527.67^oR} = 36.02\frac{lbs\,NO_X}{hr}$$

The lbs/hr of NO_x can be converted into pounds of NO_x per ton of black liquor solids using the formula C.3 presented in Appendix C of the permit. For example, during the particulate source test conducted at the No. 3 kraft recovery furnace by Fort James in October 1999, 76,000 pounds of black liquor solids were fired per hour. Thus,

$$\frac{36.02\frac{lbs\,NO_X}{hr}}{76{,}000\frac{lbs\,BLS}{hr} \times \frac{1\,ton\,BLS}{2000\,lbs\,BLS}} = 0.94\frac{lbs\,NO_X}{ton\,BLS}$$

is well within the permit limit of 1.3 lbs per ton of BLS fired.

The ideal gas equation can be found in any college textbook on gases. Ecology believes that such formulas should not be included in a Title V permit because they are widely available from any chemistry and physics handbook, any thermodynamic textbook or reference materials and are more appropriately contained in the Support Document. The permit is already lengthy and should not be made longer or more cluttered by including equations that are clearly referenced in the support document. Such streamlining of Title V permits is strongly encouraged by EPA in its White Paper Number 2 for Improved Implementation of the Part 70 Operating Permits Program, March 5, 1996, see pages 4, 34-38.

Condition A.5 - TRS Limit

The furnace has a TRS limit of 5 ppm corrected to 8% oxygen on a 12-hour average. A CEM is used to indicate continuous compliance with this limit. The furnace has met the limit continuously since 1993. The total number of contiguous periods of excess emissions in a quarter must be less than one percent of the total number of operating hours (excluding periods of startup, shutdown, or malfunction). Failure to meet the period limit may be considered a violation of the permit. The permittee shall report all excursions in the monthly report.

Condition A.6 - Operation Limits

Order DE-88-360 and PSD-88-3 required that Fort James conduct emission studies and pollution control device parameter monitoring requirements. Emission studies were conducted from 1991 to 1993. The reports for the No. 3 and No. 4 Kraft Recovery Furnaces were submitted on August 26, 1991 and February 25, 1993. Fort James prepared the Camas Mill Air Emission Monitoring Plan to reflect all the various regulatory orders including DE-88-360 and PSD-88-3. As a result of an EPA multi-media inspection in June 1994 a revised "Camas Mill Air Emission Monitoring Plan" was prepared and submitted in February 1995. This plan has been revised and updated several times to reflect changing conditions. The latest plan revision is dated October 1998. The correspondence covering the emission studies are referenced in the Camas Mill Air Emission Monitoring Plan (see Appendix D).

Operation limits selected include:

1. Hourly average of the pressure drop through the wet scrubber will be at least 2 inches of water.
2. Hourly average of the flow rate through the first stage of the scrubber will be at least 1900 gallons per minute.

Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

NO. 4 RECOVERY FURNACE
Condition B

Major Changes that Affected Emissions

The No. 4 recovery furnace was installed in 1975. The furnace was designed to reduce the dust and odor emissions from the recovery process. The furnace was converted in 1981 to a lower odor design. A wet (Teller) scrubber was added to the furnace in 1984 to reduce particulate and odor emissions. The precipitator was rebuilt in 1998 to further control particulate emissions. The performance testing required by Regulatory Order DE-88-360, approval condition #34 was conducted during the period August 20 to23 and September 24 to 25, 1990. The results of the testing are summarized in an August 20, 1991 letter to the Department.

Conditions B.1 and B.2 - Opacity and Particulate Limits

The NSPS for kraft recovery furnaces limit particulate emissions to 0.044 grains per dry standard cubic foot (gr/DSCF). Ecology has concluded that BACT rules restrict PM_{10} emissions from this furnace to 0.033 gr/DSCF corrected to 8% oxygen. Monthly particulate source testing (EPA Method 5) has been imposed on the furnace stack through orders for controlling emissions. It is assumed that 100% of the particulate measured by the method is PM_{10}. The furnace has complied with the emission limit 99% of the time since 1993. Ecology considers that the monthly particulate test frequency is sufficient to indicate continuous compliance.

With the rebuild of the precipitator, there is only a small probability that the recovery furnace would be out of compliance between monthly stack tests. Nevertheless, minimum operational conditions are placed in the permit to show that the Teller scrubber is operating. The scrubbing liquid must be monitored continuously. The hourly averages of the pressure drop through the scrubber will be at least one inch of water and the flow rate through the first stage of the scrubber will be at least 2000 gallons per minute. Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

The NSPS for a kraft recovery furnace restrict visual emissions to 35% opacity at the stack. Ecology has determined that visual emissions will be limited to 20% opacity. Because the stack plume is wet, an opacity monitor will not work. Therefore, continuous minimum operational parameters for opacity monitoring were placed in the regulatory order [WAC 173-405-072(3)(b)]. The agreed to parameters are the same as the minimum operating condition as described above for particulate. Method 9 opacity readings may be used if the minimum operational parameter is out of the prescribed operating value. This will override the minimum operational parameters results or the permittee must bring the system back in to the prescribed minimum operating value within 24 hours.

Condition B.3 - Sulfur Dioxide Limit

Ecology currently restricts SO_2 emissions from kraft recovery furnaces to 500 ppm corrected to 8% oxygen. Ecology has determined that BACT for this furnace limits sulfur dioxide emissions to 10 ppm corrected to 8% oxygen on a 24-hour average. Determination of compliance is conducted via a monthly test using a TRS CEM (EPA Method 6C). The furnace has met the limit every month since 1993. Ecology considers that the monthly sulfur dioxide test frequency is sufficient to indicate continuous compliance.

Although there is only a small probability that the recovery furnace would be out of compliance between monthly tests, the pH of the scrubber liquor is continuously monitored to assure a pH reading above 7. Records of the hourly average pH will be maintained. Whenever the hourly average pH is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

Condition B.4 - Nitrogen Oxides Limit

The oxidation/reduction reactions that occur in a black liquor recovery furnace tend to generate less nitrogen oxides (NO_x) emissions than most other large combustion devices. Careful control of air-to-fuel ratio as combustion progresses throughout the recovery furnace minimizes formation of NO_x. Because of the design and operation of the furnace, Ecology has determined that post-combustion controls are not required as BACT. The No. 3 recovery furnace is limited to a NO_x emission rate of 1.5 lbs/ton BLS. Previous stack tests have demonstrated compliance with this limit.

Refer to Section A.4, No. 3 Recovery Furnace for detailed NO_x analysis, page 27.

Condition B.5 - TRS Limit

The furnace has a TRS limit of 5 ppm on a 12-hour average. A CEM is used to indicate continuous compliance with this limit. The furnace has been in compliance with the limit 99% of the time since 1993. The total number of contiguous periods of excess emissions in a quarter must be less than one percent of the total number of operating hours (excluding periods of startup, shutdown, or malfunction) [40 CFR 284(e)(1)(i)]. Failure to meet the period limit may be considered a violation of the permit. The permittee shall report all excursions in the monthly report.

Condition B.6 - Operation Limits

Order DE-88-360 and PSD-88-3 required that Fort James conduct emission studies and pollution control device parameter monitoring requirements. Emission studies were conducted from 1991 to 1993. The reports for the No. 3 and No. 4 Kraft Recovery Furnaces were submitted on August 26, 1991 and February 25, 1993. Fort James prepared the Camas Mill Air Emission Monitoring Plan to reflect all the various regulatory orders including DE-88-360 and PSD-88-3. As a result of an EPA multi-media inspection in June 1994 a revised "Camas Mill Air Emission Monitoring Plan" was prepared and submitted in February 1995. This plan has been revised and updated several times to reflect changing conditions. The latest plan revision is dated October 1998. The correspondence covering the emission studies are referenced in the Camas Mill Air Emission Monitoring Plan (see Appendix D).

Operation limits selected include:

1. Hourly average of the pressure drop through the wet scrubber will be at least 1 inch of water.
2. Hourly average of the flow rate through the first stage of the scrubber will be at least 2000 gallons per minute.

Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

KRAFT RECOVERY FURNACE BUBBLE
Condition C

Condition C.1 - Particulate Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual particulate (PM_{10}) emissions from the No. 3 Kraft Recovery Furnace and No. 4 Kraft Recovery Furnace to 328 tons per year. To show compliance with this limit, the permittee, on a monthly* basis, will evaluate the particulate emissions for No. 3 and No. 4 Kraft Recovery Furnaces using actual emissions from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{A}\,\frac{gr}{dscf}\right)\left(\mathrm{B}\,\frac{dscf}{min}\right)\left(\frac{1\ lb}{7{,}000\ gr}\right)\left(\frac{1{,}440\ \ min}{day}\right)\left(\mathrm{N}\,\frac{days}{month}\right)\left(\frac{ton}{2{,}000\ lbs}\right)=\mathrm{C}\,\frac{tons\ PM_{10}}{month}$$

A = volumetric grain loading results from the monthly* EPA Method 5 or equivalent samplings, average of 3 one-hour runs.

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period

N = number of operating days per month

C = particulate emission rate in tons per month

This monthly* value will be summed each month in tons to determine the annual tons per year of PM_{10}.

Condition C.2 - Sulfur Dioxide Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual sulfur dioxide (SO_2) emissions from the No. 3 Kraft Recovery Furnace and No. 4 Kraft Recovery Furnace to 46.2 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the sulfur dioxide emissions for No. 3 and No. 4 Kraft Recovery Furnaces using actual CEM emissions. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(D\frac{ppmvd}{1\ x\ 10^6}\right)\left(B\frac{dscf}{min}\right)\left(\frac{0.166\ lb\ SO_2}{ft^3\ SO_2}\right)\left(\frac{1{,}440\ \ min}{day}\right)\left(N\frac{days}{month}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right) = E\frac{tons\ SO_2}{month}$$

D = CEM SO_2 concentration based on monthly sample using EPA Method 6C

B = dry standard air flow rate in cubic feet per minute – 6 month average

N = Number of operating days per month

E = SO_2 emission rate in tons per month

This monthly value will be summed each month in tons to determine the annual tons per year of SO_2. The density of sulfur dioxide, 0.166 lb SO_2 per cubic foot of $SO_{2,}$ is taken from Method 19.

Condition C.3 - NO_x Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual nitrogen oxide (NO_x) emissions from the No. 3 Kraft Recovery Furnace and No. 4 Kraft Recovery Furnace to 609 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the nitrogen oxide emissions for No. 3 and No. 4 Kraft Recovery Furnaces using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(F\frac{lb}{Ton\ BLS}\right)\left(G\frac{ton\ BLS}{month}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right) = H\frac{ton\ NOx}{month}$$

F = emission factor derived from a previous stack tests using 7E in pounds per ton of Black Liquor Solids

G = black Liquor Solids burned in each kraft recovery furnace in tons per month

H = nitrogen oxide emission rate in tons per month

The annual NOx emissions are estimated using the following algorithm:

$$\text{Annual NOx emissions} = \left(\mathrm{F}\,\frac{lb}{ton\ BLS} \right) \left(\frac{ton\ BLS}{year} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right)$$

Condition C.4 - Carbon Monoxide Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual carbon monoxide (CO) emissions from the No. 3 Kraft Recovery Furnace and No. 4 Kraft Recovery Furnace to 2755 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the carbon monoxide emissions for No. 3 and No. 4 Kraft Recovery Furnaces using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{I}\,\frac{lb}{ton\ BLS} \right) \left(\mathrm{G}\,\frac{ton\ BLS}{month} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right) = \mathrm{J}\,\frac{ton\ CO}{month}$$

I = emission factor derived from a previous stack tests using EPA Method 10 in pounds per ton of Black Liquor Solids

G = black Liquor Solids burned in each kraft recovery furnace in tons per month

J = carbon monoxide emission rate in tons per month

The annual CO emissions are estimated using the following algorithm:

$$\text{Annual CO emissions} = \left(\mathrm{I}\,\frac{lb}{ton\ BLS} \right) \left(\frac{ton\ BLS}{year} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right)$$

Condition C.5 - Volatile Organic Compounds Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual volatile organic compounds (VOC) emissions from the No. 3 Kraft Recovery Furnace and No. 4 Kraft Recovery Furnace to 219 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the volatile organic compound emissions for No. 3 and No. 4 Kraft Recovery Furnaces using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{K}\,\frac{lb\ VOC}{ton\ BLS} \right) \left(\mathrm{G}\,\frac{ton\ BLS}{month} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right) = \mathrm{L}\,\frac{ton\ VOC}{month}$$

K = emission factor derived from a previous stack tests using EPA Method 25A in pounds per ton of Black Liquor Solids
G = black Liquor Solids burned in each kraft recovery furnace in tons per month
L = volatile organic compound emission rate in tons per month

The annual VOC emissions are estimated using the following algorithm:

$$\text{Annual VOC emissions} = \left(\mathrm{K}\,\frac{VOC}{ton\ BLS}\right)\left(\frac{ton\ BLS}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

Condition C.6 - TRS Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual total reduces sulfur (TRS) emissions from the No. 3 Kraft Recovery Furnace and No. 4 Kraft Recovery Furnace to 12.7 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the TRS emissions for No. 3 and No. 4 Kraft Recovery Furnaces using actual CEM emissions. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used.

$$\left(\mathrm{M}\,\frac{ppmvd}{1\ x\ 10^{6}}\right)\left(\mathrm{B}\,\frac{dscf}{min}\right)\left(\frac{0.0883\ lb\ TRS}{ft^{3}\ TRS}\right)\left(\frac{1{,}440\ \ min}{day}\right)\left(\mathrm{N}\,\frac{days}{month}\right) = \mathrm{P}\,\frac{ton}{month}$$

M = CEM TRS concentration measured by a CEM. The monthly average will be calculated based on the average of all the valid 12-hour averages for the month.

B = dry standard air flow rate in cubic feet per minute – 6 month average

N = number of operating days per month

P = TRS emission rate in tons per month

This monthly value will be summed each month in tons to determine the annual tons per year of TRS emissions. The density of total reduced sulfur, 0.0833 lbs per cubic foot of TRS, is based on a molecular weight of 34 pounds per pound-mole and an ideal gas volume at standard conditions of 385 cubic feet per lbs mol.

NO. 3 SMELT DISSOLVER TANK
Condition D

Major Changes that Affected Emissions

The No. 3 smelt dissolver was modified in 1991. A packed-bed scrubber was installed on the dissolver tank vent to control particulate and odor emissions. The performance testing required by Regulatory Order DE-88-360, approval condition #33, and 40 CFR 60.11(e) specifically for opacity requirements were conducted September 26 to 28, 1990 and April 30 to May 2, 1991. The results of the testing are summarized in a July 24, 1991 letter to the Department.

Conditions D.1and D.2 - Opacity and Particulate Limits

The NSPS for the smelt dissolvers limit particulate emissions to 0.2 lbs per ton black liquor solids (BLS) fired at the associated recovery furnace. Ecology has concluded that BACT rules restrict PM_{10} emissions from this dissolver to 0.12 lbs/ton BLS. Monthly particulate source testing (WDOE Method 8) has been imposed on the dissolver stack through orders for controlling emissions. It is assumed that 95% of the particulate measured by the method is PM_{10}. The furnace has complied with the emission limit every month since 1993. Ecology considers that the monthly particulate test frequency and continuous monitoring of the pressure drop and scrubbing recirculation flow rate are sufficient to indicate continuous compliance.

Although there is only a small probability that the smelt dissolver would be out of compliance between monthly stack tests, minimum operational conditions are placed in the permit to show that the pollution control device is operating. The scrubbing liquid must be monitored continuously. The hourly averages of the pressure drop though the scrubber will be at least 3 inches of water and the flow rate through the first stage of the scrubber will be at least 2000 gallons per minute. Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

Ecology has concluded that visual emissions will be limited to 20 percent opacity at the stack. Because the resulting plume is wet, an opacity monitor will not work. Therefore, continuous minimum operational parameters for opacity monitoring were placed in the regulatory order [WAC 173-405-072(3)(b)]. The agreed to parameters are the same as the minimum operating conditions as described above for particulate. Method 9 opacity readings may be used if the minimum operational parameter is out of the prescribed operating value to override the minimum operational parameter results or the permittee must bring the system back in to the prescribed minimum operating value within 24 hours.

Condition D.3 - TRS Limit

The NSPS for smelt dissolvers limit TRS emissions (measured as H_2S to 0.033 lbs per ton black liquor solids (BLS) fired at the associated recovery furnace. Ecology has concluded that BACT rules restrict TRS emissions from this dissolver to 0.0168 pounds per ton BLS. Previous tests have demonstrated compliance with this limit. Order DE-88-360 and PSD-88-3 requires that monitoring, recording, and reporting of the pressure drop, the scrubber recirculation flow rate, and the scrubbing liquor's pH. When the process parameters fall within the prescribed limits, compliance with the TRS limit of 0.0168 pounds per ton will be achieved.

Ecology requires TRS be measured using EPA Method 16A/6C. According to 40 CFR § 60.283(a)(4), the reference test method required is Method 16 for use to measure TRS emissions except as provided by 40 CFR § 60.285(f)(2) (Method 16A or 16B may be used if the sampling time is 60 minutes).

Ecology recognizes the rigidity of the requirement as specified in 40 CFR § 60.285(f)(2). However, EPA's Office of Air Quality Planning and Standards in Research Triangle Park approved Method 16A/6C for use to measure TRS at the brown stock washer at Fort James Camas Mill in August 1996. Please refer to the letter dated August 27, 1996 by William F. Hunt, Emissions, Monitoring, and Analysis Division. The approval was based on an assertion that the performance of the Method 16A sampling system can be determined more efficiently on site using an instrument analytical finish (Method 6C). Ecology would like to continue to require the mill to use this method.

Condition D.4 - Operation Limit

Order DE-88-360 and PSD-88-3 required that Fort James conduct emission studies and pollution control device parameter monitoring requirements. Emission studies were conducted from 1991 to 1993. The reports for the No. 3 Smelt Dissolver Tank were submitted on August 26, 1991 and November 1991. Fort James prepared the Camas Mill Air Emission Monitoring Plan to reflect all the various regulatory orders including DE-88-360 and PSD-88-3. As a result of an EPA multi-media inspection in June 1994 a revised "Camas Mill Air Emission Monitoring Plan" was prepared and submitted in February 1995. This plan has been revised and updated several times to reflect changing conditions. The latest plan revision is dated October 1998. The correspondence covering the emission studies are referenced in the Camas Mill Air Emission Monitoring Plan (see Appendix D).

Operation limits selected include:

1. Hourly average of the pressure drop through the wet scrubber will be at least 3 inches of water.

2. Hourly average of the flow rate through the first stage of the scrubber will be at least 2000 gallons per minute.
3. Hourly average of the pH of the scrubber liquor will be at least 9.

Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop, flow rate, or pH is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

NO. 4 SMELT DISSOLVER
Condition E

Major Changes that Affected Emissions

The No. 4 smelt dissolver has not undergone changes that have affected stack emissions. The scrubber installed on the dissolver is of the same design as the newest one installed on the No. 3 smelt dissolver.

Condition E.1 and E.2 - Opacity and Particulate Limits

The NSPS for smelt dissolvers limit particulate emissions to 0.2 lbs per ton black liquor solids (BLS) fired at the associated recovery furnace. Ecology has concluded that BACT rules restrict PM_{10} emissions from this dissolver to 0.12 lbs/ton BLS. Monthly particulate source testing (WDOE Method 8) has been imposed on the dissolver stack through orders for controlling emissions. It is assumed that 95% of the particulate measured by the method is PM_{10}. The furnace exceeded the emission limit of 0.12 lbs/ton of black liquor solids for 18 days over the last five years. The most recent exceedance was in April of 1997. Ecology considers that the monthly particulate test frequency is sufficient to indicate continuous compliance.

Although there is only a small probability that the smelt dissolver would be out of compliance between monthly stack tests, minimum operational conditions are placed in the permit to show that the pollution control device is operating. The scrubbing liquid must be monitored continuously. The hourly averages of the pressure drop though the scrubber will be at least 7.5 inches of water and the flow rate through the first stage of the scrubber will be at least 2000 gallons per minute. Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report. Ecology has concluded that visual emission will be limited to 20 percent opacity at the stack. Because the resulting plume is wet, an opacity monitor will not work. Therefore, a continuous minimum operational parameter for opacity monitoring was placed in the regulatory order by an agreement [WAC 173-405-072(3)(b)]. This is the same as the minimum operating condition as described above for particulate. Method 9 opacity readings may be used if the minimum operational parameter is out of the prescribed operating value to override the minimum operational parameter results or the permittee must bring the system back in to the prescribed minimum operating value within 24 hours.

Condition E.3 - TRS Limit

The NSPS for smelt dissolvers limit TRS emissions (measured as H_2S to 0.033 lbs per ton black liquor solids (BLS) fired at the associated recovery furnace. Ecology has concluded that BACT rules restrict TRS emissions from this dissolver to 0.0168 lbs/ton BLS. Previous tests have demonstrated compliance with this limit. Order DE-88-360 and PSD-88-3 requires that monitoring, recording, and reporting of the pressure drop, the scrubber recirculation flow rate, and the scrubbing liquor's pH. When the process parameters fall within the prescribed limits, compliance with the TRS limit of 0.0168 pounds per ton will be achieved.

Condition E.4 - Operation Limits

Order DE-88-360 and PSD-88-3 required that Fort James conduct emission studies and pollution control device parameter monitoring requirements. Emission studies were conducted from 1991 to 1993. The report for the No. 4 Smelt Dissolver Tank was submitted on August 26, 1991. Fort James prepared the Camas Mill Air Emission Monitoring Plan to reflect all the various regulatory orders including DE-88-360 and PSD-88-3. As a result of an EPA multi-media inspection in June 1994 a revised "Camas Mill Air Emission Monitoring Plan" was prepared and submitted in February 1995. This plan has been revised and updated several times to reflect changing conditions. The latest plan revision is dated October 1998. The correspondence covering the emission studies are referenced in the Camas Mill Air Emission Monitoring Plan (see Appendix D).

Operation limits selected include:

1. Hourly average of the pressure drop through the wet scrubber will be at least 7.5 inches of water.
2. Hourly average of the flow rate through the first stage of the scrubber will be at least 2000 gallons per minute.
3. Hourly average of the pH of the scrubber liquor will be at least 9.

Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop, flow rate, or pH is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

KRAFT SMELT DISSOLVER BUBBLE
Condition F

Condition F.1 - Particulate Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual particulate (PM_{10}) emissions from the No. 3 Smelt Dissolver Tank Vent and No. 4 Smelt Dissolver Tank Vent to 47.8 tons per year. To show compliance with this limit, the permittee, on a monthly* basis, will evaluate the particulate emissions for No. 3 and No. 4 Smelt Dissolver Tank Vents using actual emissions from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{A}\,\frac{gr}{dscf}\right)\left(\mathrm{B}\,\frac{dscf}{min}\right)\left(\frac{1\ lb}{7{,}000\ gr}\right)\left(\frac{60\ \ min}{hour}\right)\left(\mathrm{C}\,\frac{hour}{ton\ BLS}\right)\left(\mathrm{D}\,\frac{ton\ BLS}{month}\right)=\mathrm{E}\,\frac{ton\ TSP}{month}$$

A = volumetric grain loading results from the monthly* WDOE Method 8 or equivalent samplings, average of 3 one-hour runs.
B = dry standard air flow rate in cubic feet per minute during the monthly sampling period
C = Black Liquor Solids (BLS) throughput in tons per hour during monthly* tests
D = BLS throughput in tons per month
E = total suspended particulate (TSP) emission rate in tons per month

PM_{10} conversion factor is applied to compute the required PM_{10} emission rate. The following algorithm is used to illustrate how the PM_{10} is estimated:

$$\left(\mathrm{E}\,\frac{ton\ TSP}{month}\right)\left(\mathrm{F}\,\frac{ton\ \ PM_{10}}{ton\ TSP}\right)=\mathrm{G}\,\frac{ton\ \ PM_{10}}{month}$$

F = PM_{10} conversion factor derived from actual test data
G = PM_{10} emission rate in tons per month

This monthly* value will be summed each month in tons to determine the annual tons per year of PM_{10}.

Condition F.2 - Sulfur Dioxide Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual sulfur dioxide (SO_2) emissions from the No. 3 Smelt Dissolver Tank Vent and No. 4 Smelt Dissolver Tank Vent to 28 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the sulfur dioxide emissions for No. 3 and No. 4 Smelt Dissolver Tank Vents using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(H \frac{lb\ SO_2}{ton\ BLS} \right) \left(D \frac{ton\ BLS}{month} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right) = I \frac{ton\ SO_2}{month}$$

H = emission factor derived from a previous stack test in lb per ton Black Liquor Solids. Emissions will be measured using EPA Method 6C.

D = black Liquor Solids throughput in tons per month

I = sulfur dioxide emission rate in tons per month

The annual SO2 emissions are estimated using the following algorithm:

$$\text{Annual } SO_2 \text{ emissions} = \left(F \frac{lb\ SO_2}{ton\ BLS} \right) \left(\frac{ton\ BLS}{year} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right)$$

Condition F.3 - Volatile Organic Compounds Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual volatile organic compounds (VOC) emissions from the No. 3 Smelt Dissolver Tank Vent and No. 4 Smelt Dissolver Tank Vent to 30 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the volatile organic compound emissions for No. 3 and No. 4 Smelt Dissolver Tank Vents using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(J \frac{lb\ VOC}{ton\ BLS} \right) \left(D \frac{ton\ BLS}{month} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right) = K \frac{ton\ VOC}{month}$$

J = emission factor derived from a previous stack test using EPA Reference Method 25A in pounds per ton Black Liquor Solids

D = black Liquor Solids through put in tons per month

K = volatile organic compound emission rate in tons per month

The annual VOC emissions are estimated using the following algorithm:

$$\text{Annual VOC emissions} = \left(J \frac{lb\ VOC}{ton\ BLS} \right) \left(\frac{tons\ BLS}{year} \right) \left(\frac{1\ ton}{2{,}000\ lbs} \right)$$

Condition F.4 - TRS Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual total reduced sulfur (TRS) emissions from the No. 3 Smelt Dissolver Tank Vent and No. 4 Smelt Dissolver Tank Vent to 5.4 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the TRS emissions for No. 3 and No. 4 Smelt Dissolver Tank Vents using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{L}\,\frac{\mathit{lb\ TRS}}{\mathit{ton\ BLS}}\right)\left(\mathrm{D}\,\frac{\mathit{ton\ BLS}}{\mathit{month}}\right)\left(\frac{\mathit{1\ ton}}{\mathit{2{,}000\ lbs}}\right)=\mathrm{M}\,\frac{\mathit{ton\ TRS}}{\mathit{month}}$$

L = emission factor derived from a previous stack test using EPA Method 16A/16C in lb per ton Black Liquor Solids

D = Black Liquor Solids through put in tons per month

M = TRS emission rate in tons per month

The annual TRS emissions are estimated using the following algorithm:

$$\text{Annual TRS emissions}=\left(\mathrm{L}\,\frac{\mathit{lb\ TRS}}{\mathit{ton\ BLS}}\right)\left(\frac{\mathit{ton\ BLS}}{\mathit{year}}\right)\left(\frac{\mathit{1\ ton}}{\mathit{2{,}000\ lbs}}\right)$$

NO. 4 LIME KILN
Condition G

Major Changes that Affected Emissions

The No. 4 Lime Kiln started in operation in July 1979, and was considered to be "state-of-the-art" at that time. No. 4 Lime Kiln replaced three older kilns that had served their useful life. During the Recovery and Modernization project from 1989 to 1991 no changes in the design and operation of the lime kiln occurred, other than to increase the operating rate by a factor of 1.03, to reflect the increased plant capacity. This production change resulted in an estimated 3 percent increase in emissions from this source. The Department made a determination that the proposed production and subsequent emission increases do not constitute a "major modification" according to the Department of Ecology and EPA definitions and that the No. 4 Lime Kiln was not PSD applicable.

Conditions G.1, G.2, and G.3 - Particulate and Opacity Limits

Green liquor is converted into white liquor during a set of processes known as causticizing and slaking. The residue, known as lime mud, is washed, pumped to drum filters for dewatering, and then conveyed into the kiln feed end. Process heat is generated by the combustion of residual fuel oil or natural gas. The lime kiln product, calcium oxide (CaO), reacts with the green liquor converting the sodium carbonate (Na_2CO_3) to sodium hydroxide (NaOH), forming white liquor (also referred to as active alkali). Emissions are controlled by a Ducon rectangular cross-section variable throat venturi scrubber.

Particulate matter emitted by a lime kiln typically consists of lime dust and sodium fume. The NSPS limitation for particulate from lime kilns is 0.067gr/dscf when firing natural gas and 0.13 gr/dscf when firing oil, corrected to 10 percent oxygen. In 1989 in approving the Recovery and Modernization project, the Department concluded that BACT for PM_{10} emissions from the Fort James No. 4 Lime Kiln consisted of operation of the existing kiln and control equipment such that the NSPS limits are met. An annual particulate (and PM_{10}) emission rate was established not to exceed 44 tons per year except when firing oil, whereupon the allowable emission level would be adjusted upward, based upon the relative amount of oil fired, to a maximum of 88 tons per year.

The limitation for opacity from the No. 4 Lime Kiln is a 35 percent opacity standard. Because the stack is wet, an opacity monitor would not work and was not required. The Department required that compliance with the 35 percent opacity standard be achieved by employing good operating practices for the venturi scrubber. By design, the unit is in compliance with the particulate and opacity standards when adequate flow is delivered to the scrubber unit and a certain pressure drop is maintained, as verified in previous source tests. The hourly average pressure drop across the scrubber will be at least 24 inches of water and the flow rate across the scrubber will be at least 380 gallons per minute were selected based on historical evidence, source testing, and good engineering judgement. The use of these parameters as a measure of control device performance is consistent with both US EPA Region X's interpretation of the applicability of periodic monitoring and with the intent of the Compliance Assurance Monitoring Rule (40 CFR Part 64), that a reasonable assurance of compliance can be demonstrated through a control device performance parameter(s). Records of the hourly averages for these parameters must be maintained. Whenever the hourly average pressure drop or scrubber recirculation flow rate is below the specified limits, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour excursions and corrective actions will be reported in the monthly report.

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual particulate (PM_{10}) emissions from natural gas combustion in the No. 4 Lime Kiln to 44 tons per year. To show compliance with this limit, the permittee, on a monthly* basis, will evaluate the particulate emissions for No. 4 Lime Kiln using actual emissions from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{A}\,\frac{gr}{dscf}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{1\;lb}{7{,}000\;gr}\right)\left(\frac{1{,}440\;\min}{day}\right)\left(\mathrm{C}\,\frac{days}{ADT}\right)\left(D\,\frac{ADT}{year}\right)\left(\frac{1\;ton}{2{,}000\;lbs}\right)=\mathrm{E}\,\frac{ton\;PM_{10}}{year}$$

A = volumetric grain loading results from the monthly* WDOE Method 8 or equivalent samplings, average of 3 one-hour runs with the Lime Kiln firing natural gas

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period with the Lime Kiln firing natural gas

C = kraft pulp production in ADT per day during the monthly sampling period with the Lime Kiln firing natural gas

D = total kraft pulp production in ADT per year

E = particulate emission rate in tons per year when firing natural gas

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual particulate (PM_{10}) emissions from fuel oil combustion in the No. 4 Lime Kiln to 88 tons per year. To show compliance with this limit, the permittee, on a monthly* basis, will evaluate the particulate emissions for No. 4 Lime Kiln using actual emissions from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{A}\,\frac{gr}{dscf}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{1\;lb}{7{,}000\;gr}\right)\left(\frac{1{,}440\;\min}{day}\right)\left(\mathrm{C}\,\frac{days}{ADT}\right)\left(D\,\frac{ADT}{year}\right)\left(\frac{1\;ton}{2{,}000\;lbs}\right)=\mathrm{E}\,\frac{ton\;PM_{10}}{year}$$

A = volumetric grain loading results from the monthly* WDOE Method 8 or equivalent samplings, average of 3 one-hour runs with the Lime Kiln firing fuel oil

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period with the Lime Kiln firing fuel oil

C = kraft pulp production in ADT per day during the monthly sampling period with the Lime Kiln firing fuel oil

D = total kraft pulp production in ADT per year

E = particulate emission rate in tons per year when firing fuel oil

Condition G.4 - Sulfur Dioxide Limits

The Department limits SO_2 from a lime kiln to 500 ppm corrected to 10 percent oxygen by Chapter 173-405 WAC. There is no limitation for SO_2 in the NSPS. The venturi scrubber is effective at removing the major pollutants of concern including particulate, TRS, and SO_2.

The Department concluded in the Recovery and Modernization project review that BACT for SO_2 from a scrubber controlled lime kiln is an annual emission rate of 36.1 tons per year. This emission rate is equivalent to an average SO_2 concentration of 41 ppm.

Emissions are required to be measured monthly using an approved TRS CEM that conforms to 40 CFR Part 60, App. B and F, Perf. Spec. 2. Test results are reported to the Department in the Kraft Mill Air Monitoring Report. The test results are used to compute the annual emissions.

Condition G.5 - Sulfur Dioxide Limits

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual sulfur dioxide (SO_2) emissions from the No. 4 Lime Kiln to 36.1 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the sulfur dioxide emissions for No. 4 Lime Kiln using actual CEM emissions. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{F}\,\frac{ppmvd}{1\;x\;10^6}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{0.166\;lb\;SO_2}{ft^3\;SO_2}\right)\left(\frac{1{,}440\;\min}{day}\right)\left(\mathrm{N}\,\frac{days}{year}\right)\left(\frac{1\;ton}{2{,}000\;lbs}\right)=\mathrm{G}\,\frac{ton\;SO_2}{year}$$

F = CEM SO_2 concentration based on monthly sample using EPA Method 6C

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period - 6 month average

N = number of operating days per year

G = SO_2 emission rate in tons per year

The density of sulfur dioxide, 0.166 lb SO_2 per cubic foot of SO_2, is taken from Method 19.

Conditions G.6, G.7, and G.8 - Nitrogen Oxides, Carbon Monoxide and Volatile Organic Compounds

These pollutants from lime kilns are not regulated under the Federal NSPS or state regulations, other than that BACT must be used for NO_x and CO control, and LAER must be used for VOC control. In 1989 under PSD 88-3 the Department determined that BACT for NO_x, CO and LAER for VOC was the proper operation and maintenance of the lime kiln and the scrubber used for control of particulate, SO_2 and TRS emissions.

Annual emissions from the lime kiln were established at 234 tons per year NO_x, 1798 tons per year CO, or 45 tons per year VOC. Compliance is demonstrated by calculating emissions using a combination of emission factors and actual emissions from previous stack test results.

Condition G.6 - Nitrogen Oxides Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual nitrogen oxide (NO_x) emissions from the No. 4 Lime Kiln to 234 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the nitrogen oxide emissions for No. 4 Lime Kiln using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(F\,\frac{lb\ NOx}{ton\ CaO}\right)\left(G\,\frac{ton\ CaO}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right) = H\,\frac{ton\ NOx}{year}$$

F = emission factor derived from a previous stack test in lb per ton Calcium Oxide throughput

G = lime kiln calcium oxide throughput in tons per year
(A conversion factor to convert ADT to tons of CaO is used)

H = nitrogen oxide emission rate in tons per year

Condition G.7 - Carbon Monoxide Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual carbon monoxide (CO) emissions from the No. 4 Lime Kiln to 1798 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the carbon monoxide emissions for No. 4 Lime Kiln using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{I}\,\frac{lb\ CO}{ton\ CaO}\right)\left(\frac{ton\ CaO}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{J}\,\frac{ton\ CO}{year}$$

I = emission factor derived from a previous stack test in lb per ton Calcium Oxide.

G = lime kiln calcium oxide throughput in tons per year
(A conversion factor to convert ADT to tons of CaO is used)

J = carbon monoxide emission rate in tons per year.

Condition G.8 - Volatile Organic Compound Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual volatile organic compounds (VOC) emissions from the No. 4 Lime Kiln to 45 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the volatile organic compound emissions for No. 4 Lime Kiln using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{K}\,\frac{lb\ VOC}{ton\ CaO}\right)\left(\mathrm{G}\,\frac{ton\ CaO}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{L}\,\frac{ton\ VOC}{year}$$

K = emission factor derived from a previous stack tests using EPA Method 25A in lb per Calcium Oxide

G = lime kiln calcium oxide throughput in tons per year
(A conversion factor to convert ADT to tons of CaO is used)

L = volatile organic compound emission rate in tons per year

Condition G.9 - Total Reduced Sulfur Limit

Total reduced sulfur (TRS) emissions from lime kilns are limited by the NSPS to 8 parts per million by volume on a dry basis (ppmdv) corrected to 10 percent oxygen on a 12-hour average. In 1989 under PSD 88-3 the Department concluded that BACT was the 12-hour average of TRS emission level of 8 ppmdv corrected to 10.0 percent oxygen. An annual average from the No. 4 Lime Kiln was established at 2.5 tons per year, which equates to an annual TRS emission level of 4 ppmdv.

Fort James has installed, certified, and presently maintains a CEM for TRS. Monitoring results are reported monthly to the Department in the Kraft Mill Air Monitoring Report. These results are used to calculate the annual TRS emissions.

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual total reduces sulfur (TRS) emissions from the No. 4 Lime Kiln to 2.5 tons per year. To show compliance with this limit, the permittee, on a monthly basis, will evaluate the TRS emissions for No. 4 Lime Kiln using actual CEM emissions. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{M}\,\frac{ppmd}{1\ x\ 10^{6}}\right)\left(\mathrm{B}\,\frac{dscf}{min}\right)\left(\frac{0.0883\ lb\ TRS}{ft^{3}\ TRS}\right)\left(\frac{1{,}440\ \ min}{day}\right)\left(\mathrm{N}\,\frac{days}{month}\right)\left(\frac{1\ ton}{2{,}000\ lb}\right)=\mathrm{O}\,\frac{ton\ TRS}{month}$$

M = TRS concentration measured by a CEM using EPA Method 16 or 16A. The monthly average will be calculated based on the average of all the valid 12-hour averages for the month.

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period

O = TRS emission rate in tons per month

This monthly value will be summed each month to determine the annual tons per year of TRS emissions. The density of total reduced sulfur, 0.0833 lbs per cubic foot of TRS, is based on a molecular weight of 34 pounds per pound-mole and an ideal gas volume at standard conditions of 385 cubic feet per pound-mole.

Condition G.10 Operation Limits

Order DE-88-360 and PSD-88-3 required that Fort James conduct emission studies and pollution control device parameter monitoring requirements. Emission studies were conducted in 1997. The report for the No. 4 Lime Kiln was submitted on September 3, 1997. Fort James prepared the Camas Mill Air Emission Monitoring Plan to reflect all the various regulatory orders including DE-88-360 and PSD-88-3. As a result of an EPA multi-media inspection in June 1994 a revised "Camas Mill Air Emission Monitoring Plan" was prepared and submitted in February 1995. This plan has been revised and updated several times to reflect changing conditions. The latest plan revision is dated October 1998. The correspondence covering the emission studies are referenced in the Camas Mill Air Emission Monitoring Plan (see Appendix D).

Operation limits selected include:

1. Hourly average of the pressure drop through the wet scrubber will be at least 24 inches of water.
2. Hourly average of the flow rate through the first stage of the scrubber will be at least 380 gallons per minute.

Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

Condition G.11 TRS Limits (state-only)

WAC 173-405-040(3)(b) limits total reduced sulfur (TRS) emission concentrations from the No. Lime Kiln to 80 parts per million corrected to 10 percent oxygen on a period of two consecutive hours. 40 CFR 60.283(a)(5) limits TRS emission concentrations from the No. 4 Lime Kiln to 8 parts per million corrected to 10 percent oxygen. As identified in Order DE-88-360 modification 2 and PSD-88-3 modification 2, Fort James will operate a continuous emission monitor for TRS on the Lime Kiln (with a range of 0 to 30 ppmvd) to show compliance with the 8 ppmvd limit. Fort James will use the results of this monitoring to show compliance with the 80 ppmvd limit as well. Readings at or below 30 ppmvd will be considered in compliance with the 80 ppmvd limit.

Ecology provides the following discussion in response to the EPA Region X comment regarding the compliance demonstration at the Magnefite boiler. In EPA's view, this comment is directed towards the lack of a factual basis to support using an emission factor from a previous source test to represent NO_x, CO, and VOC emissions under the anticipated range of operations.

In the No. 4 Lime Kiln, NO_x, CO, and VOC emissions are a function of the type of fuel, combustion temperature, and the excess oxygen level. For the Lime Kiln either natural gas or fuel oil can be used as the fuel. In the past several years' natural gas has been the primary fuel. Combustion temperature and excess oxygen levels are within a relatively narrow range.

Ecology requires that performance tests be conducted at a representative production rate, near the design rate of the process. If the operating rate exceeds the average production values and still meets the air emissions standards, the overall assessment is that the source test was representative and the system was in continuous compliance. Using data derived from source tests conducted at high levels of production or throughput to calculate potential emissions overstates actual emissions. To demonstrate this fact we offer the example of Fort James Camas' NO_x emissions calculations for the No. 3 Power Boiler: Source tests from similar emission units were used to calculate potential to emit emissions of 433 tons per year, the permit limit in the PSD permit and the Title V Air Operating Permit. Actual emissions as monitored by the NO_x CEM from 1994 to 1998 have been 130, 104, 148, 128, and 140 tons per year respectively. Refer to Response A.4, Table 1 for more discussion on actual NO_x emissions.

The Annual Emission Inventory for NO_x, CO, and VOC emission for the No. 4 Lime Kiln have been reported as follows:

Lime Kiln Emission Summary for NO_x, CO, and VOC

POLLUTANT	Permit Limit	1994	1995	1996	1997	1998
NO_x	234	100	95	102	110	113
CO	1798	21	20	18	20	20
VOC	45	11	10	9	10	10

Until 1995 emission factors compiled by NCASI were used to calculate annual emissions. In February 1995 in preparation for the Title V Air Operating Permit application, Fort James conducted source tests on the No. 4 Lime Kiln. The test results for NO_x, CO, and VOC emissions are displayed below. All tests showed the lime kiln has been operated in compliance with the permit limits. The source tests deviated from the emission factors used in that the actual CO emissions were considerably less than the predicted by the NCASI emission factor and the VOC emissions were also significantly less.

Date	NOx			CO			VOC		
	Test Lbs/hr	Test tpy	Limit tpy	Test lbs/hr	Test tpy	Limit tpy	Test lbs/hr	Test tpy	Limit tpy
2/14/95	26.5	114	234	0.10	0.5	1798	0.05	0.3	45

The No. 4 Lime Kiln is backup incinerator for the non-condensable gases and will also be the backup incinerator for the stripper off-gases. It is anticipated that the kiln will be used approximately 10% of the time for incineration of these gases. Fort James plans to conduct a source test to determine the effect of the addition of the stripper off-gases on emissions.

Emissions are dependent on how well Fort James operates and maintains process equipment and air pollutant control equipment. Based on available records on file, all of the regulated emission units have regular schedules to conduct preventative maintenance activities. Ecology requires that this equipment must be operated as efficiently as possible. Also, Fort James expresses that it wants to operate all combustion units in that manner to save fuel on a cost standpoint; i.e., fuel consumption vs. efficiency and cost.

Magnefite Recovery Furnace/ Acid Plant
Condition H

Major Changes that Affected Emissions

There are no federal NSPS for sulfite pulp mills. The Department of Ecology regulates sulfite pulp mills under Chapter 173-410 WAC. The Magnefite Recovery Furnace is controlled by a multiclone followed by a four module absorption system, low pressure drop venturi scrubber. In 1991 Fort James during the mill Energy and Recovery Modernization Project installed a new caustic-based, upflow scrubber to increase SO_2 control efficiency. The scrubber was located downstream of the absorption system and a 720 foot high stainless steel stack was constructed. Fort James applied for and was granted Emission Reduction Credits for the 650 tons per year of SO_2 that was reduced. Part of the SO_2 Emission Reduction Credits were utilized for the No. 3 Power Boiler. This reallocation of SO_2 emissions was accomplished by the Department in DE-88-360 modification 2 and PSD-88-3 modification 2.

In 1995 Fort James decided to utilize the Magnefite Recovery Furnace for primary incineration of the noncondensible gases (NCG) which were previously burned in the No. 4 Lime Kiln. The No. 4 Lime Kiln is utilized as the backup incinerator for the NCG system.

Condition H.1, H.2, and H.3 - Opacity and Particulate Limits

Chapter 173-410 limits the Fort James Magnefite Recovery Furnace to a maximum particulate concentration of 0.10 gr/dscf corrected to 8.0 percent oxygen, and no greater than 35 percent opacity. Monthly particulate source testing (WDOE Method 8) is required. It is assumed that 90% of the particulate measured by the method is $PM_{10.}$

Minimum operating conditions were established by the Department and EPA in the PSD Determination signed on October 16, 1991. The minimum operating conditions required that Fort James monitor as a means of continuous particulate limitation compliance assurance the flow rate across the scrubber and the pressure drop. The hourly average pressure drop across the scrubber will be at least 0.2 inches of water and the flow rate across the scrubber will be at least 1800 gallons per minute. Records of the hourly averages for these parameters will be maintained. Hourly averages that are below the minimum will be reported in the monthly Magnefite Air Monitoring Report to the Department.

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual particulate (PM_{10}) emissions from the Magnefite Recovery Furnace to 144 tons per year. To show compliance with this limit, the permittee shall, on a monthly* basis, evaluate the particulate emissions for Magnefite Recovery Furnace using actual emissions from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{A}\,\frac{gr}{dscf}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{1\ lb}{7{,}000\ gr}\right)\left(\frac{1{,}440\ \min}{day}\right)\left(\mathrm{N}\,\frac{days}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{C}\,\frac{ton\ PM}{year}$$

A = volumetric grain loading results from the monthly* WDOE Method 8 or equivalent samplings, average of 3 one-hour runs.
B= dry standard air flow rate in cubic feet per minute during the monthly sampling period
N = number of operating days per year
C = particulate emission rate in tons per year

Condition H.4 - Sulfur Dioxide Limit

The Department and EPA concluded in the PSD Determination in October 1991 that BACT to achieve sulfur dioxide emissions was a caustic scrubber. The emissions are required to be measured by using a continuous emission monitor (EPA Method 6c). Monitoring results are reported to the Department in the Magnefite Air Monitoring Report. Results from the continuous emission monitor are used to calculate the annual emissions. In the BACT determination process an SO_2 emission limit of 10 ppmvd corrected to 7 % oxygen on a 24-hour average was selected as an appropriate emission limit. The annual limit for sulfur dioxide is 23 tons per year.

Condition H.5 - Sulfur Dioxide Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual sulfur dioxide (SO_2) emissions from the Magnefite Recovery Furnace to 23 tons per year. To show compliance with this limit, the permittee, on a monthly basis, evaluate the SO_2 emissions for the Magnefite Recovery Furnace using actual CEM emissions. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{D}\,\frac{ppmvd}{1\ x\ 10^6}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{0.166\ lb\ SO_2}{ft^3\ SO_2}\right)\left(\frac{1{,}440\ \min}{day}\right)\left(N\,\frac{days}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{E}\,\frac{ton\ SO_2}{year}$$

D = CEM SO_2 concentration measured by a CEM using EPA Method 16. The monthly average will be calculated based on the average of all the valid 24-hour averages for the month

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period

N = number operating days per year

E = SO_2 emission rate in tons per year

Conditions H.6, H. 7, H.8, and H.9 - Nitrogen Oxides, Carbon Monoxide, Volatile Organic Compounds

These pollutants from the Magnefite recovery furnace are not regulated under the Federal NSPS or state regulations, other than that BACT must be used for NO_x and CO control, and LAER must be used for VOC control. In the October 1991 PSD determination the Department and EPA determined that BACT for NO_x and CO and LAER for VOC was proper operation and maintenance of the Magnefite recovery furnace and the scrubber used for control of particulate and SO_2. Annual emission limits were established at 336 tons per year NO_x, 880 tons per year CO, and 144 tons per year VOC. The annual emissions are calculated using a combination of emission factors and actual emissions from previous stack test results.

Condition H.6 - Nitrogen Oxides Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual nitrogen oxide (NO_x) emissions from the Magnefite Recovery Furnace to 336 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the nitrogen oxide emissions for the Magnefite Recovery Furnace using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{F}\,\frac{lb\ NO_X}{ADUT}\right)\left(\mathrm{G}\,\frac{ADUT}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{H}\,\frac{ton\ NO_X}{year}$$

F = emission factor derived from a previous stack test using EPA Method 7E in lb per air dry ton of unbleached pulp

G = unbleached pulp throughput in the Magnefite recovery process in air dry tons per year

H = nitrogen oxide emission rate in tons per year

Condition H.7 - Carbon Monoxide Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual carbon monoxide (CO) emissions from the Magnefite Recovery Furnace to 880 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the carbon monoxide emissions for the Magnefite Recovery Furnace using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{I}\,\frac{lb\ CO}{ADUT}\right)\left(\mathrm{G}\,\frac{ADUT}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{J}\,\frac{ton\ CO}{year}$$

I = emission factor derived from a previous stack test using EPA Method 10 in lb per ton air dry unbleached pulp

G = unbleached pulp throughput at the Magnefite recovery furnace in air dry tons per year

J = carbon monoxide emission rate in tons per year.

Condition H.8 - Minimum Excess Level

Excess oxygen levels will be monitored continuously to ensure compliance with the CO emission limitations. Records of the hourly average excess oxygen levels will be maintained. Whenever the hourly average excess oxygen level is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported monthly in the Magnefite Air Monitoring Report.

Condition H.9 - Volatile Organic Compound Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual volatile organic compounds (VOC) emissions from the Magnefite Recovery Furnace to 144 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the volatile organic compound emissions for the Magnefite Recovery Furnace using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used.

$$\left(\mathrm{K}\,\frac{lb\ VOC}{ADUT}\right)\left(\mathrm{G}\,\frac{ADUT}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{L}\,\frac{ton\ VOC}{year}$$

K = emission factor derived from a previous stack test using EPA Method 25A in lb per air dry ton on unbleached pulp (ADUT)

G = unbleached pulp throughput in air dry tons per year

L = volatile organic compound emission rate in tons per year

Condition H.10 Operation Limits

Order DE-88-360 and PSD-88-3 required that Fort James conduct emission studies and pollution control device parameter monitoring requirements. Emission studies were conducted in 1991 through 1993. The reports for the Magnefite Recovery Furnace were submitted on June 25, 1991. Fort James prepared the Camas Mill Air Emission Monitoring Plan to reflect all the various regulatory orders including DE-88-360 and PSD-88-3. As a result of an EPA multi-media inspection in June 1994 a revised “Camas Mill Air Emission Monitoring Plan” was prepared and submitted in February 1995. This plan has been revised and updated several times to reflect changing conditions. The latest plan revision is dated October 1998. The correspondence covering the emission studies are referenced in the Camas Mill Air Emission Monitoring Plan (see Appendix D).

Operation limits selected include:

1. Hourly average of the pressure drop through the wet scrubber will be at least 0.2 inches of water.
2. Hourly average of the flow rate through the first stage of the scrubber will be at least 1800 gallons per minute.

Records of the hourly average of these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-410-040(4). One-hour average excursions and corrective actions will be reported in the monthly report.

Ecology provides the following discussion in response to the EPA Region X comment regarding the compliance demonstration at the No. 4 Lime Kiln. In EPA's view, this comment is directed towards the lack of a factual basis to support using an emission factor from a previous source test to represent NO_x, CO, and VOC emissions under the anticipated range of operations.

In the Magnefite Recovery Furnace, $NO_{x,}$ CO, and VOC emissions are a function of the type of fuel, combustion temperature, and the excess oxygen level. For the Magnefite Recovery Furnace the fuels, combustion temperature, and excess oxygen levels are within a relatively narrow range. Red liquor solid is being the fuel type which is a spent liquor fuel similar to the No. 3 and 4 Kraft Recovery Furnaces.

Ecology and EPA require that performance tests be conducted at a representative production rate, near the design rate of the process. Additional source tests are conducted at or above the average operating rate. If the operating rate exceeds the average production values and still meets the air emissions standards, the overall assessment is that the source test was representative and the system was in continuous compliance. Using data derived from source tests conducted at high levels of production or throughput to calculate potential emissions overstates actual emissions. To demonstrate this fact we offer the example of Fort James Camas' NO_x emissions calculations for the No. 3 Power Boiler: Source tests from similar emission units were used to calculate potential to emit emissions of 433 tons per year, the permit limit in the PSD permit and the Title V Air Operating Permit. Actual emissions as monitored by the NO_x CEM from 1994 to 1998 have been 130, 104, 148, 128, and 140 tons per year respectively. Refer to Response A.4, Table 1 for more discussion on actual NO_x emissions.

After the initial performance tests as required per PSD Permit No. 88-3, additional source tests for NOx, CO, and VOC were conducted on the Magnefite Recovery

Furnace. The test results are displayed below. All tests showed the furnace has been operated in compliance with the permit limits.

Date	NOx			CO			VOC		
	Test lbs/hr	Test Tpy	Limit tpy	Test Lbs/hr	Test tpy	Limit tpy	Test lbs/hr	Test tpy	Limit tpy
2/15/95	78.1	328	336	0.03	0.2	880	1.70	7.2	144
11/3-5/97	67.0	281	336	1.6	6.8	880	0.8	3.4	144
6/15-17/99	70.4	296	336	3.3	13.9	880	1.6	6.8	144

The Magnefite Recovery Furnace was changed to the primary incinerator of the non-condensable gases in November 1996. With the decision to construct a Foul Condensate Steam Stripping System for odor control and MACT purposes, another series of tests were conducted to obtain baseline emission data prior to the incineration of steam stripper off-gases (SOGs). The SOGs will be incinerated in the Magnefite Recovery Furnace with the Lime Kiln serving as the backup incineration unit. The series of tests conducted in 1999 demonstrated that the following emission factors were appropriate for the Camas Mill. These results were submitted to Ecology in a letter dated July 15, 1999.

Camas Magnefite Recovery Furnace/Acid Plant Performance Test Results

Pollutant	Emission Factor[a] lb/ton RLS[b]	Emission Factor[a] lb/therm natural gas
CO	0.24	
NO_x	0.56	0.054
VOC	0.09	

[a] Previously submitted test data demonstrated a strong correlation between the amount of natural gas added to the fuel mixture and the NO_x produced. It was thus possible to separate the NO_x contributions from the two fuels (red liquor and natural gas) and calculate the respective emission factors. There was no similar correlation for CO or VOC. The emission factors were taken from the total amount of CO or VOC produced at mid-range red liquor and natural gas firing rates.
[b] RLS – red liquor solids.

It is anticipated that with the stripper off-gases the above value(s) may change. Once the Foul Condensate Stripping System is stable in operation, Fort James plans to conduct another series of emission tests to determine the effect of the addition of the stripper off-gases on emissions.

Emissions are dependent on how well Fort James operates and maintains process equipment and air pollutant control equipment. Based on available records on file, all of the regulated emission units have regular schedules to conduct preventative maintenance activities. Ecology requires that this equipment must be operated as efficiently as possible. Also, Fort James expresses that it wants to operate all combustion units in that manner to save fuel on a cost standpoint; i.e., fuel consumption vs. efficiency and cost.

Annual Emission Inventory for the NO_x, VOC, and CO emissions has been reported as follows:

Magnefite Recovery Furnace Annual Emission Inventory

POLLUTANT	Permit Limit TPY	1994 TPY	1995 TPY	1996 TPY	1997 TPY	1998 TPY
NO_x	336	232	215	311	294	271
VOC	144	112	95	106	120	3
CO	880	690	587	656	740	44

Note: prior to 1998 used NCASI emission factors

No. 3 POWER BOILER
Condition I

Major Changes that Affected Emissions

In 1991 the No. 1 and No. 2 Power Boilers were decommissioned. The No. 3 Power Boiler was converted from primarily oil to hog fuel firing. Natural gas is used to assist in hog fuel combustion. A new electrostatic precipitator was installed to control particulate matter. This decommissioning and conversion was accomplished during the Camas Energy and Recovery Modernization Project. Reductions of particulate matter and sulfur dioxide (SO_2) emissions were realized with this project. Sources making modifications were required to obtain a Prevention of Significant Deterioration permit and Notice of Construction approval. Emissions of nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds were above the significance levels required to trigger PSD for those pollutants. Emissions of total reduced sulfur (TRS) compounds were increased as a result of the project, but the increase was below the significance level required to trigger PSD for that pollutant. The Energy and Recovery Modernization project was approved by the Department and EPA under orders PSD-88-3 and DE88-360. Modifications to the orders were made on October 18, 1991 and on September 1998. Performance testing of the rebuilt boiler occurred on June 16 and 18, and on July 18, 1992. The results are summarized in a July 21, 1992 letter to the Department.

Conditions I.1, I.2, and I.3 - Particulate and Opacity Limits

The major emission of concern from hog fuel boilers is particulate matter, although other pollutants, particularly carbon monoxide, may be emitted under poor operating conditions. Generation of particulate matter depends on a number of variables, such as furnace design, the composition of hog fuel burned, and combustion air control. The hog fuel boilers that were decommissioned used cyclonic flow separators, cyclones, to remove particulate from the air discharge. This method provided relatively inefficient control of particulate especially PM_{10}. In the late 1980's the No. 1 and No. 2 Power Boilers emitted a combined average of 538 tons of particulate per year.

EPA regulates hog fuel boiler emissions under 40 CFR 60 Part Db – Standards of Performance for Industrial-Commercial Steam Generating Units. Subpart Db limits particulate emissions to 0.10 lb/million Btu. This particulate concentration is equivalent to 0.05 gr/dscf corrected to 7% oxygen. Subpart Db also limits opacity to no greater than 20 percent on a six-minute average except for one six minute period per hour of not more than 27 percent. The Department of Ecology General Regulation Chapter 173-400 WAC, limits the particulate emissions from hog fuel boilers to 0.20 gr/dscf corrected to 7 percent oxygen and 20 percent opacity, except that opacity may exceed 20 percent for up to 15 consecutive minutes once in any eight hours. It was generally recognized the Department's regulation did not represent BACT for any new or modified facility.

The Department agreed that a three-field ESP attaining a PM_{10} emission level of 0.01 gr/dscf represented BACT for control of particulate emissions on the No. 3 Power Boiler. The annual PM_{10} emission limit was established at 36 tons per year. Emissions are measured monthly using EPA Method 5. The test results are reported monthly to the Department in the Power Plant Air Monitoring Report. The test results are used to compute the annual emissions. It is assumed that PM_{10} equals total particulate.

Trace metals chromium, manganese, and nickel are emitted as a by-product of the combustion of wood. Studies indicated that metallic compounds are released during combustion of wood condense out to the vapor phase as flue gas temperatures drop below 500 degrees F. The Department concluded that design and operation of the No. 3 Power Boiler ESP in the matter for BACT of particulate emissions, with the temperature at the inlet of the ESP held to below 500 degrees F represented BACT for metals. The temperature of the gases entering the No. 3 Power Boiler ESP in continuously monitored. If the temperature is greater than the 500 degrees F corrective action must be taken within 24 hours.

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual particulate (PM_{10}) emissions from the No. 3 Power Boiler to 36 tons per year. To show compliance with this limit, the permittee, on a monthly* basis, will evaluate the particulate emissions for No. 3 Power Boiler using actual emissions from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{A}\,\frac{gr}{dscf}\right)\left(\mathrm{B}\,\frac{dscf}{\min}\right)\left(\frac{1\ lb}{7{,}000\ gr}\right)\left(\frac{1{,}440\ \min}{day}\right)\left(\mathrm{N}\,\frac{days}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{C}\,\frac{ton\ PM}{year}$$

A = volumetric grain loading results from the monthly* EPA Method 5 or equivalent samplings, average of 3 one-hour runs.
B = dry standard air flow rate in cubic feet per minute during the monthly sampling period

N = number of operating days per year

C = particulate emission rate in tons per year

This monthly* value will be summed to determine the annual tons per year of PM_{10} emissions.

Condition I.4 - Sulfur Dioxide Limits

The sulfur dioxide limits were established in the PSD-88-3 and Order DE-88-360 dated February 14, 1989. Based on new emission factors developed by NCASI and actual source tests, the annual emission limit was modified in Order DE-88-360 modification 2 and PSD-88-3 modification 2 at 99 tons per year.

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual sulfur dioxide (SO_2) emissions from the No. 3 Power Boiler to 99 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the SO_2 emissions for the No. 3 Power Boiler using an emission factor derived from previous stack tests. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{D}\,\frac{lb\ SO_2}{ton\ H.F.}\right)\left(\mathrm{E}\,\frac{ton\ H.F.}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{F}\,\frac{ton\ SO_2}{year}$$

D = emission factor derived from a previous stack tests using EPA Method 6C in pounds per ton of hog fuel (H.F.)

E = hog fuel throughput at the No. 3 Power Boiler in tons per year

F = SO_2 emission rate in tons per year

Conditions I.5 - Nitrogen Oxides Limits

The NSPS Subpart Db limits NO_x emissions from hog fuel boilers with greater than 100 million BTU/hr heat input capacity to 0.30 lb/ million Btu. There are no restrictions on NO_x emissions from hog fuel boilers in the Department of Ecology regulations. The Department concluded that NO_x control on the No. 3 Power Boiler is a NO_x concentration of 0.25 lb/million Btu on a thirty-day rolling average, achieved by appropriate boiler design and operation. The Department required that Fort James install, certify, and maintain a CEM for NO_x. Emissions are monitored with a continuous emission monitor using EPA Method 7E. Monitoring results are reported monthly in the Power Plant Air Monitoring Report. These results are used to compute the annual emissions.

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual nitrogen oxide (NO_x) emissions from the No. 3 Power Boiler to 433 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the nitrogen oxide emissions for the No. 3 Power Boiler using CEM data. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{G}\,\frac{lb}{MMBtu}\right)\left(\mathrm{H}\,\frac{dry\,ton\,HF}{year}\right)\left(16.8\,\frac{MMBtu}{dry\,ton\,HF}\right)\left(\frac{1\ ton}{2000\ lbs}\right)=\mathrm{I}\,\frac{ton\ NO_X}{year}$$

G = average annual nitrogen oxide concentration measured by CEM using EPA Method 7E

H = total dry ton hog fuel burned per year

I = nitrogen oxide emission rate in tons per year

Conditions I.6 and I.7 - Carbon Monoxide and Volatile Organic Compounds Limits

Carbon monoxide and VOCs are produced as a by-product of incomplete combustion. The Department concluded that BACT for control of CO and LAER for control of VOC was boiler design, monitoring and control, and operation and maintenance to achieve annual emission limits of 1040 tons of CO per year and 121 tons of VOC per year. Compliance is determined by calculating CO and VOC emissions using actual previous stack test results.

Condition I.6 - Carbon Monoxide Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual carbon monoxide (CO) emissions from the No. 3 Power Boiler to 1040 tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the carbon monoxide emissions for the No. 3 Power Boiler using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{I}\,\frac{lb\ CO}{ton\ H.F.}\right)\left(\mathrm{E}\,\frac{tons\ H.F.}{year}\right)\left(\frac{1\ tons}{2{,}000\ lbs}\right)=\mathrm{J}\,\frac{ton\ CO}{year}$$

I = emission factor derived from a previous stack tests using EPA Method 10 in pound per ton of hog fuel
E = hog fuel throughput at the No. 3 Power Boiler process in tons per year
J = carbon monoxide emission rate in tons per year

Condition I.7 - Volatile Organic Compound Limit

Order DE-88-360 modification 2 and PSD-88-3 modification 2 limit annual volatile organic compounds (VOC) emissions from the No. 3 Power Boiler to 121tons per year. To show compliance with this limit, the permittee, on an annual basis, will evaluate the volatile organic compound emissions for the No. 3 Recovery Furnace using an emission factor derived from previous stack test results. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{K}\,\frac{lb\ VOC}{ton\ H.F.}\right)\left(\mathrm{E}\,\frac{ton\ H.F.}{year}\right)\left(\frac{1\ ton}{2{,}000\ lbs}\right)=\mathrm{L}\,\frac{ton\ VOC}{year}$$

K = emission factor derived from a previous stack tests using EPA Method 25A in pounds per ton of hog fuel
E = hog fuel throughput in tons per year at the No. 3 Power Boiler
L = volatile organic compound emission rate in tons per year

Condition I.8 - ESP inlet temperature

Trace metals chromium, manganese, and nickel are emitted as a by-product of the combustion of wood. Studies show that metallic compounds released during combustion of wood condense out to the vapor phase as flue gas temperatures drop below about 500°F. In Order DE-88-360 and PSD-88-3, Ecology established as BACT for trace metals that Fort James would operate the No. 3 Power Boiler at a level below 500°F, in order to minimize condensation and collection of the trace metals.

Records of the hourly average of this parameter will be maintained. Whenever the hourly average ESP inlet temperature is greater than the specified operating limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly report.

Condition I.9 - Operation Limits

Opacity is an indicator of the performance of the electrostatic precipitator, the particulate matter control device. The use of this monitor as a measure of control device performance is consistent with both U.S. EPA's Region X's interpretation of the applicability of periodic monitoring and with the intent of the Compliance Assurance Monitoring Rule (40 CFR Part 64), that a reasonable assurance of compliance can be demonstrated through a control device performance indicator.

Whenever the parameter is greater than the specified operating range, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Corrective actions and opacity excursions will be reported in the monthly report.

Ecology provides the following discussion in response to the EPA Region X comment regarding the compliance demonstration at the No. 3 Power Boiler. In EPA's view, this comment is directed towards the lack of a factual basis to support using an emission factor from a previous source test to represent NO_x, CO, and VOC emissions under the anticipated range of operations.

SO_2, CO and VOC emissions are a function of the type of fuel, combustion temperature, and the excess oxygen level in the particular combustion unit. For the No. 3 Power Boiler the fuels, combustion temperature, and excess oxygen levels are within a relatively narrow range.

Emissions are dependent on how well Fort James operates and maintains process equipment and air pollutant control equipment. Based on available records on file, all of the regulated emission units have regular schedules to conduct preventative maintenance activities. Ecology requires that this equipment must be operated as efficiently as possible. Also, Fort James expresses that it wants to operate all combustion units in that manner to save fuel on a cost standpoint; i.e., fuel consumption vs. efficiency and cost.

Ecology and EPA require that an initial performance test be conducted at a representative production rate, near the design rate of the process. Additional source tests are conducted at or above the average operating rate. If the operating rate exceeds the average production values and still meets the air emissions standards, the overall assessment is that the source test was representative and the system was in continuous compliance. Using data derived from source tests conducted at high levels of production or throughput to calculate potential emissions overstates actual emissions. To demonstrate this fact we offer the example of Fort James Camas' NO_x emissions calculations for the No. 3 Power Boiler: Source tests from similar emission units were used to calculate potential to emit emissions of 433 tons per year, the permit limit in the PSD permit and the Title V Air Operating Permit. Actual emissions as monitored by the NO_x CEM from 1994 to 1998 have been 130, 104, 148, 128, and 140 tons per year respectively. Refer to Response A.4, Table 1 for more discussion on actual NO_x emissions.

Annual emissions of SO_2, NO_x, CO, and VOC are tabulated below. Emissions for pollutants measured by source tests in 1998 have demonstrated that emissions at representative operating conditions are well within the permit limits. For example, PM_{10}, SO_2, NO_x, VOC, and CO emissions are 24%, 52%, 32%, 0.3%, and 2%, respectively.

No. 3 Power Boiler Annual Emission Inventory

POLLUTANT	PERMIT LIMIT	1994 TPY	1995 TPY	1996 TPY	1997 TPY	1998 TPY
PM	36	22	8	11	15	8.6
SO_2	99	159[a]	42	73	56	52
NO_x	433	130	104	148	128	140
VOC	121	51	30	52	42	0.7[b]
CO	1040	442	264	456	367	23[b]

(a) In 1994 No. 3 Power Boiler served as backup to the No. 4 Lime Kiln to incinerate NCG gases. In 1996 the primary incinerator was changed to the Magnefite Recovery Furnace with the No. 4 Lime Kiln as backup

(b) Prior to 1998 emission factors were used to calculate emissions, actual source test data was utilized in 1998.

No. 4 POWER BOILER
Condition J

Major Changes that Affected Emissions

The No. 4 Power Boiler has not been modified, since air pollution regulations have been promulgated. The Department's general regulations apply and the particulate limit is 0.1 gr/dscf. Three state only regulations apply including the 20 percent opacity limit. The Department has required that a continuous opacity monitor be installed and maintained. Opacity excursions are reported monthly in the Power Plant Air Monitoring Report. The opacity limit is a state-only requirement.

Condition J.1 – Particulate Limits

The No. 4 Power Boiler ensures compliance when firing natural gas and fuel oil based on the following calculations:

For particulate matter (PM) emissions from natural gas:

1. 5 lb PM/MMcf natural gas. Taken from Table 1.4-2 of AP-42, October 1996, for natural gas combustion.
2. F_d = 8,710 dscf/MMBtu for natural gas. "F" factor from 40 CFR, Part 60, App. A, Method 19.
3. Conversion factor of 1,035 MMBtu/MMcf natural gas.

$$\left(\frac{5\ lbs}{MMcf}\right)\left(\frac{1\ MMcf}{1{,}035\ MMBtu}\right)\left(\frac{1\ MMBtu}{8{,}710\ dscf}\right)\left(\frac{7{,}000\ gr}{1\ lb.}\right)\left(\frac{20.9 - 7.0}{20.9}\right) = 0.003\,\frac{gr}{dscf}$$

Therefore, the maximum actual particulate emissions of 0.003 gr/dscf corrected to 7% O_2 generated from natural gas combustion are less than the permit limit value of 0.1 gr/dscf. No ongoing compliance demonstration measures are required when firing natural gas.

For particulate matter (PM) emissions from fuel oil:

1. [9.19(S)+3.22] lb/1000 gallons fuel oil. Taken from Table 1.3-1 of AP-42, October 1996, for fuel oil combustion. For 2 percent sulfur content, fuel oil this equates to a particulate matter emission factor of 21.6 lb/1000 gallon.
2. F_d = 9,190 dscf/MMBtu for oil. "F" factor from 40 CFR, Part 60, App. A, Method 19.
3. Conversion factor of 141 MMBtu/1000 gallons fuel oil.

$$\left(\frac{21.6\ lbs}{1{,}000\ gal}\right)\left(\frac{1{,}000\ gal}{141\ MMBtu}\right)\left(\frac{1\ MMBtu}{9{,}190\ dscf}\right)\left(\frac{7{,}000\ gr}{lb}\right)\left(\frac{20.9\ -\ 7.0}{20.9}\right) = 0.08\,\frac{gr}{dscf}$$

Therefore, the maximum actual particulate emissions of 0.08 gr/dscf corrected to 7% oxygen generated from fuel oil combustion are less than the permit limit value of 0.1 gr/dscf.

Condition J.2 - Opacity Limits

The Department of Ecology General Regulation Chapter 173-400 WAC, limits opacity to 20 percent, except that opacity may exceed 20 percent for up to 15 consecutive minutes once in any eight hours. [WAC 173-400-040(1)(a).] The Department has required that a continuous opacity monitor be installed and maintained. Opacity excursions are reported monthly in the Power Plant Air Monitoring Report.

Fort James installed a continuous opacity monitor at the No. 4 Power Boiler in 1992. The monitor follows the procedures outlined in the Camas Mill's Power Boiler Opacity Continuous Emission Monitors Quality Control/Quality Assurance Manual. All calibration data including frequency and quality objectives comply with 40 CFR Part 60 Appendix B, Performance Specification 1 and 40 CFR 60.13(d).

Condition J.3 – Sulfur Dioxide Limit

One of the other state-only requirements is the 1000 ppm, hourly average for sulfur dioxide. Fort James predominately burns natural gas in the boiler. This emission unit cannot exceed the limit when firing natural gas. Fort James conducted firing trials in 1997 burning fuel oil only in the boiler. These trials and these resulting emission calculations revealed that as long as the sulfur content of the fuel was below 2 percent by weight that the sulfur dioxide limit is attained. Fort James is required to maintain fuel receipts to ensure that the fuel oil is less than or equal to 2 percent sulfur.

Condition J.4 - Operation Limits (state-only)

The average opacity will be no greater than 20 percent for more than 6 consecutive minutes in any 60 minutes period. Whenever the parameter is greater than the specified operating range, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Corrective actions and opacity excursions will be reported in the monthly report.

KRAFT DIGESTERS
CONDITION K

Major Changes that Affected Emissions

There are 13 kraft batch digesters at the Camas Mill. Noncondensible gases (NCG) are vented through a turpentine recovery system to the kraft NCG system for incineration in the Magnefite Recovery Furnace or to the No. 4 Lime Kiln which is the backup incinerator. The system has been modified over the years in an effort to minimize the number of hours that NCGs were not combusted each month. Four Kraft digesters were constructed in 1987-1988 with construction completed in June 1988. These four digesters are No. 5, No. 11, No. 12, and No. 13 Kraft digesters and New Source Performance Standards apply. The non-condensible gases are incinerated in lime kiln or Magnefite Recovery Furnace thus an exemption applies under 40 CFR 60.283(a)(1)(iii).

Condition K.1 - TRS and NCG Limits

The permit requires the Camas Mill to treat all currently collected noncondensible gases (NCG) to reduce TRS emissions equal to reduction achieved by thermal oxidation in the Magnefite Recovery Furnace or the No. 4 Lime Kiln. To show compliance with this limit, the permittee must record the number of hours that NCGs generated were not combusted each month and conduct monthly visual inspections of the current NCG system. Whenever the NCG system malfunctions, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Periods of non-combustion will be reported in the monthly kraft mill monitoring report. Periods of non-combustion that arise from the need to prevent loss of life or limb are not subject to and are not counted in determining total time periods of non-combustion. Periods of non-combustion are not considered a violation of this permit limit if the periods are less than one percent of total process operating time excluding periods of startup, shutdown, or malfunction. [40 CFR 63.443(e)(1).]

WHITE LIQUOR SCRUBBERS AT K3/K4/R8 AND K5 BLEACH PLANTS
Condition L

Major Changes that Affected Emissions

The first bleach plant was installed at Camas in 1924 for the sulfite pulping operation. Over the years, expansions resulted in five bleach plants being in operation in the late 1970's all of which utilized chlorine as the bleaching chemical. During the early 1980's three of these bleach plants were completely shut down. The remaining two were to be used for Magnefite, K3 Bleach Plant, kraft blend (softwood/hardwood) bleaching (K4 Bleach Plant). In 1983 a new kraft bleaching system was constructed consisting of two 90-foot high displacement-bleaching towers. This system provided bleaching for the kraft softwood pulping line, K5 Bleach Plant. Bleach plant collection systems and scrubbers were installed to treat gasses from the towers. For the K5 Bleach Plant the scrubber was constructed with two packed sections. The lower section was about 25 feet high and used sulfur dioxide, SO_2, water as an anti-chlor medium. The upper section was about 3 feet thick and used cool water to absorb any residual SO_2 that was released from the lower section. A chlorine dioxide generator (R-8 process), with a three stage absorption system was installed which also included a scrubber to treat the vent gases. These processes and pollution control features were state of the art at that time.

In 1995 the mill in anticipation of the EPA Cluster Rules, installed white liquor scrubbers. White liquor scrubbers are the Best Available Control Technology for handling bleach plant chlorine and chlorine dioxide emissions. One system collects and treats gases from the K3/K4 Bleach Plant and R-8 chlorine dioxide generator and is completely new. At the K4 Bleach Plant process changes also eliminated the use of sodium hypochlorite as a bleaching agent. Other process changes included that oxygen pre-retention tubes be added to the caustic extraction stages and replacement of the existing K4 chlorine dioxide tower with a new tower having a much longer retention time. The K5 Bleach Plant white liquor scrubber utilized some of the existing equipment with increased fan capacity and using white liquor. Chlorine and chlorine dioxide emissions were dramatically reduced when these process changes and scrubbing systems were placed into operation in late 1995 and mid 1996.

Currently, the K3 Bleach Plant continues to handle Magnefite pulp and the Maximum Sustained Rate (MSR) Design Production Rate is 525 ADUT/D. Its present bleach sequence is CEHD. The K4 Bleach Plant consists of sawdust and softwood (blend line) pulp and the MSR Design Production Rate is 432 ADUT/D. Its present bleach sequence is $C_DE_{OP}D$. The percent chlorine dioxide substitution is a minimum or 15 percent. The K5 bleach plant consists of softwood pulp and the MSR Design Production Rate is 850 UBADT/D. Its present bleach sequence is $C_DE_{OW}WD$. The percent chlorine dioxide substitution is a minimum of 45 percent. Depending upon market conditions, the wood species may change in the different bleach plants; however, the estimated permit emissions from the pulping and bleaching operation were based upon the wood species that emits the highest emissions. Based upon EPA Cluster Rule requirements, the Magnefite furnace or K3 Bleach Plant will be rearranged to become total chlorine free by April 16, 2001. Fiber line changes will be necessary for both K4 and K5 so that these two lines will become elementally chlorine free by April 16, 2001. Fort James is not planning to provide more chlorine dioxide production capacity. Pulping mill fiber line changes will be completed so that the existing chlorine dioxide capacity will be able to produce the desired products. For the K5 fiber line that will be necessary to install a two stage pressurized oxygen system ahead of the K55 Bleach Plant. The oxygen delignification system will require more white liquor from the kiln/recausticizing area. Fort James has indicated that it will be submitting the Notice of Construction for these improvements in early 1999.

Condition L.1 - Chlorine and Chlorine Dioxide from K3/K4/R8 W.L. Scrubber

Order DE 96-AQI059 required Fort James to maintain scrubbing liquor pH of 10.0 on an hourly average basis. The scrubber pH is monitored continuously. A record of the hourly averages will be maintained. One-hour average excursions will be reported in the monthly report.

Condition L.2 & L.3 - Opacity & Operation Limits for K3/K4/R8 W.L. Scrubber (state-only)

The Department has established a state-only requirement of no visible emissions or 0 % opacity from the bleach plant scrubbers. Compliance with this requirement would be demonstrated by the following scrubber surrogate parameters.

The hourly average pressure drop across the scrubber will be at least 3.0 inches of water and the circulation flow rate will be at least 150 gallons per minute. Records of the hourly averages for these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly Kraft Mill Air Monitoring Report.

Condition L.4 - Chlorine and Chlorine Dioxide from K5 W.L. Scrubber

Order DE-96-AQ1059 required that Fort James maintain a scrubbing liquor pH at a minimum of 10.0 hourly average. The scrubber pH is monitored continuously. Records of the hourly averages will be maintained. One-hour average excursions will be reported in the monthly report.

Conditions L.5 and L.6 - Opacity & Operation Limits for K5 W.L. Scrubber (state-only)

The Department has established a state-only requirement of no visible emissions (0% Opacity) from the Bleach Plant Scrubbers. Compliance with this requirement would be demonstrated by the following scrubber surrogate parameters.

The hourly average pressure drop across the scrubber will be at least 1.5 inches of water and the circulation flow rate will be at least 110 gallons per minute. Records of the hourly averages for these parameters will be maintained. Whenever the hourly average pressure drop or flow rate is below the specified limit, the permittee will take corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). One-hour average excursions and corrective actions will be reported in the monthly Kraft Mill Air Monitoring Report.

WILL II SHEETER
Condition M

Major Changes that Affected Emissions

The Will II Sheeter was completed in the summer of 1993 and reached full production on September 14, 1993. Particulate emissions control was provided by a Steelcraft Filtrex Model MP pulse jet baghouse. The original filtration bags were Filtrex Model WI 16-oz woven polyester tube bags. The original equipment style bags were replaced in 1996 with polyester bags that contained a textured Teflon membrane liner for more effective particulate capture. The Will II Sheeter started operation on June 21, 1993. The particulate performance test was performed on December 2, 1993 and the results were submitted in April 1994.

Particulate Emission Control

Emission control at the Will II Sheeter is achieved using a fabric filter baghouse. Fabric filter baghouses are considered BACT for paper dust emissions. Source tests conducted after construction of the Sheeter (1993 and 1996) indicate that the unit emits less than 1 ton of particulate per year. These results were achieved when the baghouse pressure drop was within the manufactured specifications. To maintain these results, Ecology and Fort James have determined that the pressure drop will be monitored and corrective action taken when it is out of a range of 0.2-6.0 inches of water.

The design of fabric filtration control equipment, such as baghouses, depends upon a number of parameters. These parameters include the following: the design outlet particulate concentration, the choice of filter media, the gas to cloth ratio, the particulate being captured, and the particulate penetration of the filter media, pressure drop, and volumetric flow rate. Once the baghouse is constructed all of the parameters are approximately constant except for the pressure drop. For each filter media installation there is a normal range of pressure drops. When the pressure drop across the bags is small, it is usually indicates a control equipment failure (broken bags, holes, or seal leakage). Excessive pressure drops denote an overloaded system, poor bag cleaning or pluggage. For the bags that used at the mill, particulate collection efficiency is directly proportional to the pressure drop being a minimum at 0.2 when the bag is clean and a maximum at 6.0 inches of water when the bag is fully loaded. Above 6.0 inches of water particulate capture declines due to a reduction in the volumetric flow rate. As recorded through a maintenance program, pressure drop has ranged from 0.6 inches of water with all new bags to a high of 4.2 inches of water. The pressure drops have not exceeded this value because the facility has taken immediate corrective action. The first step is inspection followed by maintenance.

The original filtration bags were Filtrex Model WI 16 oz. woven polyester tube bags. These bags were used until the summer 1996 when replacement bag availability issues forced the mill to consider other supplies. On September 1996, the original equipment style bags were replaced with alternative bags from Baghouse Accessories (BHA, Slater, Missouri). These 16 oz. woven polyester tube bags also contain a texture teflon membrane liner for more effective particulate capture (refer to source test results in the table above). The baghouse collects paper dust from a paper cutting (converting) operation. The Sheeter is not a combustion unit. There are no HAPs emitted from this source.

Ecology and EPA require new sources to conduct initial performance tests at representative production rates, near the design rate of the process. Additional source tests shall be conducted at or above the average operating rate. If the operating rate exceeds the average production values and the measured emissions still meet the air emissions standards, the overall assessment is that the source test was representative and the system is in continuous compliance. It has been Ecology's experience that emission factors calculated from source tests conducted at high levels of production or throughput overstate actual emissions. For example, source tests from similar emission units indicated that the No. 3 Power Boiler would emit 433 tons of NO_x per year. A NO_x monitor installed after construction of the boiler was complete measured actual emissions of only 130, 104, 148, 128, and 140 tons each year from 1994 to 1998.

There have been two compliance tests at this source since the startup in 1993. The results are as followed:

	Test Date 12/02/93	**Test Date 12/10/96**
Sheeter Production Rate, tons/day	257	282
Particulate, gr/dscf	0.001	0.00028
Limit, gr/dscf	0.008	0.008
Pressure Drop Range, Inches of Water	2.1 - 2.2	2.1 - 2.2

The No. 2 Will Sheeter Baghouse Differential Pressure in Inches of Water (Pressure Drop) from 1997 -- 1999 is displayed in the following table. These data were collected through an operation and maintenance program approved by the Department of Ecology.

Date 1997	**ΔP^c**	**Date 1997**	**ΔP^c**	**Date 1998**	**ΔP^c**	**Date 1998**	**ΔP^c**	**Date 1999[b]**	**ΔP^c**	**Date 1999**	**ΔP^c**
1/06	2.0	7/07	2.8	1/05	3.0	6/29	a	1/04	3.0	6/28	3.4
1/13	2.2	7/14	2.7	1/13	3.1	7/08	2.2	1/11	2.2	7/06	3.8
1/20	2.2	7/21	a	1/19	2.9	7/13	3.0	1/19	3.1	7/13	3.2
1/27	2.5	7/28	2.7	1/26	3.3	7/20	2.2	1/26	3.2	7/19	3.3

2/03	2.0	8/04	2.8			7/27	2.2	2/01	3.1	7/26	4.0
2/10	2.5	8/11	2.7	2/02	2.4	8/04	2.8	2/08	3.5	8/02	3.8
2/17	2.1	8/19	2.6	2/09	a	8/10	3.2	2/15	3.5	8/09	3.6
2/24	2.0	8/25	2.6	2/16	2.5	8/17	2.5	2/21	3.8	8/17	2.2
3/03	2.0	9/02	2.5	2/23	2.6	8/23	3.2	3/01	3.6	8/22	3.7
3/10	2.3	9/08	2.7	3/04	2.7	9/01	3.2	3/08	3.6	8/30	3.2
3/17	a	9/15	2.7	3/09	2.9	9/08	2.5	3/15	3.5	9/07	3.6
3/25	2.6	9/22	a	3/17	2.6	9/14	3.2	3/22	4.0	9/14	3.3
4/01	2.5	9/29	2.5	3/23	2.6	9/21	3.2	3/29	3.0	9/21	3.8
4/07	2.5	10/06	2.9	3/30	2.7	9/28	2.5	3/30	3.4	9/27	3.6
4/14	2.7	10/13	3.0	4/09	3.0	10/05	2.8	4/06	3.6	10/04	3.2
4/21	2.1	10/21	3.0	4/13	2.5	10/12	3.2	4/12	3.9	10/11	4.0
4/28	2.7	10/27	2.9	4/20	2.8	10/19	2.2	4/19	3.4	10/18	3.2
5/05	a	11/03	2.9	4/28	2.5	10/26	3.0	4/26	3.2	10/25	3.4
5/12	2.7	11/10	2.8	5/04	2.8	11/02	2.8	5/04	3.7	11/01	4.0
5/19	2.6	11/20	3.0	5/11	2.8	11/09	2.5	5/11	3.8	11/08	3.4
5/27	2.9	11/24	2.9	5/18	a	11/16	2.8	5/17	3.8	11/15	3.8
6/02	2.3	12/01	2.7	5/25	2.5	11/23	a	5/24	3.3	11/22	3.4
6/09	a	12/08	a	6/01	2.8	12/01	2.4	5/30	4.0	11/29	1.0
6/16	2.9	12/18	3.4	6/08	2.8	12/08	3.0	6/07	3.2	12.06	1.8
6/24	2.8	12/22	a	6/15	3.0	12/15	4.2	6/14	3.6	12/13	2.0
6/30	2.6	12/29	2.9	6/22	2.2	12/21 12/28	2.9 2.5	6/21	3.3		

a Shutdown for maintenance or curtailment
b Observations to date
c Differential pressure across the Will II Sheeter Baghouse

This table shows that the equipment is operated in a narrow range of pressure drops to achieve the best efficiency of the control equipment. It also shows that the maintenance program designed for this baghouse is beneficial and functional; and if corrective actions needed, then they were promptly carried out by the mill operator. Ecology is confident that the baghouse will provide adequate particulate control for this operation at all time provided that the monitored pressure drops are within the range of 0.2 to 6.0 inches of water during the operation. Therefore, continuous pressure drop monitoring, on-going maintenance program, and a particulate source test once per permit term is sufficient basis for compliance assurance.

<u>Condition M.1, M.2. & M.3 - Particulate and Opacity Limits</u>

Order DE 93AQ-I140 required that the particulate emission concentration from the baghouse stack shall not exceed 0.008 gr/dscf and that the opacity shall not exceed 5%. A performance test demonstrated compliance with this limit. The amount of particulate emitted by the stack was minuscule. The average particulate concentration was 0.001 grain/dscf. This is well below the regulatory limit. A particulate test using EPA Method 5 will be conducted once per permit term and consist of three one-hour tests using EPA Method 5 or a test method approved in writing by the Department. Using the performance test an emission factor was developed that is used to calculate the annual emission limit. As an example to illustrate how the mass loading limit is estimated, the following algorithm can be used:

$$\left(\mathrm{A}\frac{gr}{dscf}\right)\left(\mathrm{B}\frac{dscf}{min}\right)\left(\frac{1\ lb}{7{,}000\ gr}\right)\left(\frac{1{,}440\ \ min}{day}\right)\left(\mathrm{N}\frac{days}{year}\right)\left(\frac{1\,ton}{2{,}000\ lbs}\right)=\mathrm{C}\frac{tons\ PM_{10}}{month}$$

A = volumetric grain loading results from the monthly* EPA Method 5 or equivalent samplings, average of 3 one-hour runs.

B = dry standard air flow rate in cubic feet per minute during the monthly sampling period

N = number of operating days per year

C = particulate emission rate in tons per year

<u>Condition M.4 - Operation Limits</u>

Although there is only a small probability that the baghouse would be out of compliance, minimum operational conditions have been defined in the permit to show that the baghouse is operating. The baghouse pressure drop shall be monitored continuously. Weekly readings shall confirm that the pressure drop shall be maintained within a range of 0.2 to 6.0 inches of water.

A record of the pressure drop observations will be maintained. Whenever the pressure drop is beyond the specified limits, the permittee will initiate corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Excursions and corrective actions will be reported in the monthly report.

Wood Processing
Conditions N, O, P, and Q

Major Changes that Affected Emissions

In 1987 the Camas Mill expanded kraft pulping capacity. Improvements and expansion in the wood processing area were made that affected three specific sources, the Screen Fines Truck Bin Cyclone, the Chip Packing Cyclone, and the Magnefite Chip/Sawdust Truck Dump Conveyor. In 1995 the Camas Mill constructed the K4 Fines Blow Line. These improvements in the wood processing area were aimed at preventing or minimizing fugitive wood from impacting adjacent property. These emission units would have been categorized as insignificant emission unit as defined under WAC 173-401-530(4). However, these units are operated under Regulatory Orders DE-87-309 and 95-AQI050. Therefore, these units are an applicable requirement under the State Implementation Plan (SIP) under WAC 173-401-530(2)(c).

Conditions N.1, N.2, & N.3 - Particulate and Opacity Limits – Screen Fines Truck Bin Cyclone

In Order DE-87-309 the Department determined that the Screen Fines Truck Bin Cyclone represented best available control technology. Particulate limits were established as 0.007 gr/dscf with an annual limit of 2.6 tons per year. A performance test confirmed compliance with the 0.007 gr/dscf limit. Compliance with the annual limit is demonstrated by using actual emissions from previous stack test results.

Ecology and EPA require that an initial performance test for a new source be conducted at a representative production rate, near the design rate of the process. Additional source tests are conducted at or above the average operating rate. If the operating rate exceeds the average production values and still meets the air emissions standards, the overall assessment is that the source test was representative and the system was in continuous compliance. Using data derived from source tests conducted at high levels of production or throughput to calculate potential emissions overstates actual emissions. To demonstrate this fact we offer the example of Fort James Camas' NO_x emissions calculated for the No. 3 Power Boiler: Source tests from similar emission units were used to calculate potential to emit emissions of 433 tons per year, the permit limit in the PSD permit and the Title V Air Operating Permit. Actual emissions as monitored by the NO_x CEM from 1994 to 1998 have been 130, 104, 148, 128, and 140 tons per year respectively. These values are based on actual operating hours and throughput and are much less than using a value from a source test and a representative production rate to calculate emissions.

The "potential to emit" threshold for the screen fines truck bin cyclone was estimated to be approximately 2.6 tons per year. The initial performance test reveals that emissions are significantly less than 1 ton per year. Considering the magnitude of the emissions and the performance of cyclones in controlling wood dust emissions, the Department considers the permit, as written, meeting the Title V requirement of "monitoring sufficient to demonstrate compliance."

Condition N.4 - Operation Limits – Screen Fines Truck Bin Cyclone

In Order DE-87-309 the Department determined that a monthly inspection is required. An inspection log will be maintained and made available for review by Ecology. A monthly inspection of the cyclone is adequate. Whenever the cyclone malfunctions, the conditions which may indicate holes in the cyclone, cyclone pluggage, mechanical defects that cause wood dust to become airborne, the permittee will initiate corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Excursions and corrective actions will be reported in the monthly report.

Conditions O.1, O.2, and O.3 - Particulate and Opacity Limits – Chip Packing Cyclone

The Department determined in Order 87-309 that the Chip Packing Cyclone represented best available control technology. Particulate limits were established as 0.007 gr/dscf with an annual limit of 1.4 tons per year. Compliance with the annual limit is demonstrated by using actual emissions from previous stack test results.

Ecology and EPA require that an initial performance test for a new source be conducted at a representative production rate, near the design rate of the process. Additional source tests are conducted at or above the average operating rate. If the operating rate exceeds the average production values and still meets the air emissions standards, the overall assessment is that the source test was representative and the system was in continuous compliance. Using data derived from source tests conducted at high levels of production or throughput to calculate potential emissions overstates actual emissions. To demonstrate this fact we offer the example of Fort James Camas' NO_x emissions calculated for the No. 3 Power Boiler: Source tests from similar emission units were used to calculate potential to emit emissions of 433 tons per year, the permit limit in the PSD permit and the Title V Air Operating Permit. Actual emissions as monitored by the NO_x CEM from 1994 to 1998 have been 130, 104, 148, 128, and 140 tons per year respectively. These values are based on actual operating hours and throughput and are much less than using a value from a source test and a representative production rate to calculate emissions.

The "potential to emit" threshold for the chip packing cyclone was estimated to be approximately 1.4 tons per year. The initial performance test reveals that emissions are significantly less than 1 ton per year. Considering the magnitude of the emissions and the performance of cyclones in controlling wood dust emissions, the Department considers the permit, as written, meets the Title V requirement of monitoring sufficient to demonstrate compliance.

Condition O.4 - Operation Limits – Chip Packing Cyclone

In Order DE-87-309 the Department determined that a monthly inspection is required. An inspection log will be maintained and made available for review by Ecology. A monthly inspection of the cyclone is adequate. Whenever the cyclone malfunctions, the conditions which may indicate holes in the cyclone, cyclone pluggage, mechanical defects that cause wood dust to become airborne, the permittee will initiate corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Excursions and corrective actions will be reported in the monthly report.

Condition P.1 - Operation Limits – Magnefite Chip/Sawdust Truck Dump Conveyor

Wood chips and sawdust are source of particulate emissions. Thus, handling the materials by closed conveyors will help to minimize the particulate emissions. Refer to the following discussions for particulate emissions controls. Based on our engineering judgment, there will be no detectable sulfur dioxide emissions generated from the operation of the conveyors.

In Order DE-87-309 the Department determined that a monthly inspection is required. The Department required Fort James to provide water sprays, chutes, deflectors, or socks at conveyor discharge points. An inspection log will be maintained and made available for review by Ecology. A monthly inspection of the emission control equipment was determined to be adequate. Whenever the water sprays, chutes, and socks malfunction, the permittee will initiate corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Excursions and corrective actions will be reported in the monthly report.

Condition Q.1 - Operation Limits – K4 Fines Blow Line

Order 95-AQI050 requires Fort James to provide water sprays and deflectors that would be operated continuously during chip discharge at the K4 fines blow line. The water pressure will be maintained at a minimum of 30 psig. The inspection of the water sprays will be conducted on a daily basis and an inspection log will be maintained and made available for review by Ecology. Whenever the water sprays and deflectors malfunction, the permittee will initiate corrective action within 24 hours. Failure to take corrective action within 24 hours is a violation of WAC 173-405-040(10). Excursions and corrective actions will be reported in the monthly report.

Printing Operation
Condition R

Major Changes that Affected Emissions

The final NESHAPS for printing was issued on May 30, 1996. The Fort James Camas Mill is not impacted by the Printing MACT other than that Fort James was required to make an initial notification. This was accomplished with the submittal of the revised Air Operating Permit application on August 29, 1997, which satisfied the regulation 40 CFR 63.830(b)(1). The mill must limit the amount of total hazardous air pollutants in the printing operation to less than 400 kg per month or limit the total amount of material applied in printing to less than 500 kg per month.

The Fort James Camas Mill is a major source of HAP and is subject only to the requirements of 63.829(e) and 63.830(b)(1) of 40 CFR Subpart KK as long as the mill stays below the following application rates on a monthly basis. [40 CFR 63.821 (b)]

(1) The owner or operator of the source applies no more than 500 kg per month, for every month, of inks coatings, varnishes, adhesives, primers, solvents, thinners, reducers, and other materials on product and packaging rotogravure or wide-web flexographic printing presses, or

(2) The owner or operator of the source applies no more than 400 kg per month, for every month, of organic HAP on product and packaging rotogravure or wide-web flexographic printing presses.

Facility-Wide General Requirements

Condition 9

During the public comment period for the draft permit, EPA recommended that Ecology should add to this monitoring condition a requirement to do a weekly walk-through for Conditions 1-8, and to keep records of the results of those observations.

Ecology has considered your recommendation of a weekly walk-through inspection for Conditions 1 through 8, including documentation of the results of the observation. We have determined that the weekly-walk-through inspection conflicts with the already required inspection schedules for numerous point sources and area emission sources, including chip pile operation, conveyor, blow lines, etc…Ecology believes that the specified inspection frequency for these sources is adequate and should be retained as required in the permit.

Condition 32

Condition 32 states that "Submittal of reports of any required monitoring by this permit must be submitted to Ecology within 15 days of the end of each calendar month. The reports must clearly identify all instances of deviations from permit requirements."

Ecology incorporates applicable requirements of WAC 173-405-072 and WAC 173-401-615(3)(a) into Condition 32.

WAC 173-401-615(3)(a) requires that the Permittee submit reports of any required monitoring at least once in every six month period, including all deviations from the permit requirements. In order to satisfy this requirement, the Permittee must refer to WAC 173-405-072 for the scope of what constitutes required monitoring. Ecology lists the required monitoring program as specified in the regulation for a clarification purpose as follows:

1) Particulate: the results of monthly particulate test on each source during the month of affected emission units as specified in the permit.
2) TRS:
    a) The average TRS concentration express parts per million for each recovery furnace and lime kiln stack.
    b) The date and time and concentration of TRS for each TRS exceedance and the total numbers of hours of the exceedance.
3) Opacity:
    a) The date and time of opacity in excess of the standard.
    b) If equipment for continuous monitoring of opacity is not available, continuous operating parameters may be required by a regulatory order as an alternate. If an alternate is approved, the date and time of each occurrence in excess of the regulatory order must be reported.

4) Production: The average daily production of air-dried unbleached pulp.
5) Other data: Each kraft mill shall furnish, upon request of Ecology, such other pertinent data required to evaluate the mill's emissions or emissions control program.

Both WAC 173-405-072 and WAC 173-401-615(3)(a) prescribe the reporting frequency. WAC 173-405-072 requires that the Permittee submit this monitoring report once each month, as specified in Fort James' Air Operating Permit. WAC 173-401-615(3)(a) requires such report once every six months. Both regulations state that the Permittee must include all instances of deviations from the permit requirements. Ecology thus concludes that the report frequency is more stringent in WAC 173-405-072 than that of WAC 173-401-615(3)(a).

Ecology determined that Condition 32 satisfactorily addresses the applicable requirements of WAC 173-405-072 and WAC 173-401-615(3)(a). Appendix B of this Support Document includes a sample of the Permittee's monthly air emissions monitoring report to Ecology.

APPENDIX A

Historical Particulate Emission Testing Results

APPENDIX B

Monthly Air Emission Monitoring Reports

APPENDIX C

Historical Emission Reductions

APPENDIX D

Camas Mill Air Emission Monitoring Plan

APPENDIX E

Fulfilled One-Time Requirements

APPENDIX E
APPLICABILITY OF NEW SOURCE PERFORMANCE STANDARD
ONE-TIME ONLY REQUIREMENTS

The Fort James Camas Mill has the following emission units where New Source Performance Standards apply: No. 4 Lime Kiln; Kraft Digesters No. 5 and No. 11, No. 12, and No. 13; No. 3 Smelt Dissolver; and No. 3 Power Boiler. One-time requirements are included under 40 CFR Part 60.7 Notification and record keeping and 40 CFR Part 60.8 Performance tests. These one-time requirements and submittals are included in the following table:

Emission Unit	Initial Notification/ Date Constructed	CEM Certification	Date of Submittal and/or WDOE action	Performance Tests	Date of Submittal and/or WDOE action
No. 4 Lime Kiln	**November 10, 1977** **July 1979**	**TRS CEM** **Scrubber pressure drop and flow rate established in PSD-88-3 Modification 2 and DE-88-360 Modification 2**	**April 20, 1990** **March 29, 1996 PSD-88-3 Modification 2 DE-88-360 Modification 2 March 25, 1999**	**Particulate: October 2-3, 1979** **TRS: September 15, 1980**	**Particulate: August 12, 1980** **TRS: September 15, 1980**
No. 5, No. 11, No.12, & No. 13 Kraft Digesters	**July 14, 1987 / June 1988**	**Gases are incinerated in a lime kiln or Magnefite recovery furnace exemption applies under 40 CFR 60.283(a)(1)(iii)**	**March 29, 1996 PSD-88-3 Modification 2 DE-88-360 Modification 2 March 25, 1999**	**Gases are incinerated in a lime kiln or Magnefite recovery furnace exemption applies under 40 CFR 60.283(a)(1)(iii)**	**March 29, 1996 PSD-88-3 Modification 2 DE-88-360 Modification 2 March 25, 1999**

Emission Unit	Initial Notification/ Date Constructed	CEM Certification or Monitoring Requirements	Date of Submittal and/or WDOE action	Performance Tests	Date of Submittal and/or WDOE action
No. 3 Smelt Dissolver	September 16, 1988 / June 1990	Scrubber pressure drop and flow rate established in PSD-88-3 Modification 2 and DE-88-360 Modification 2	March 29, 1996 PSD-88-3 Modification 2 DE-88-360 Modification 2 March 25, 1999	September 26, 27, & 28, 1990 and April 30 to May 2, 1991	July 24, 1991
No. 3 Power Boiler	September 16, 1988 / May 1992	Nitrogen Oxides CEM; Opacity CEM; Monitoring Plan; ESP Design and Performance Report	CEM/Monitoring Plan/ESP Design and Performance Report: August 27, 1992	June 16 & 18, 1992 and July 18, 1992	July 21, 1992
North Brown Stock Washers	July 28, 1981 / July 1983	Exempt from NSPS	WDOE letter dated September 18, 1981. EPA letter dated May 31, 1996.	Exempt from NSPS. Performance tests: February, 1995 & September 1996. Method approval by EPA dated August 27, 1996.	WDOE letter dated September 18, 1981. EPA letter dated May 31, 1996.

SUPPORT DOCUMENT ADDENDUM

First Revision April 3, 2001
Second Revision December 17, 2001
Third Revision October 23, 2003

TSD102303.doc

for the Air Operating Permit issued to

FORT JAMES CAMAS LLC
401 N.E. ADAMS STREET
CAMAS, WA 98607-1999

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
300 DESMOND DRIVE
P. O. BOX 47600
OLYMPIA, WASHINGTON 98504-7600

The Addendum to the Operating Permit Support Document fulfills the operating permit rule, "Statement of Basis," requirement and explains particular portions of the air operating permit for the Fort James Camas Mill. The Washington Department of Ecology responds to the Petition (Order No. X-1999-1) and the Comment Letter dated July 11, 2001 from the Environmental Protection Agency regarding the Fort James Camas Mill's Title V Permit by providing this document to 1) impose on the Permittee additional requirements, and/or 2) support the Department's determination.

This document is not part of the operating permit for Fort James Camas Mill. Nothing in this document is enforceable against the Permittee, unless otherwise made enforceable by permit or order.

1. <u>Condition A.4</u> (NOx Standard for No. 3 Kraft Recovery Furnace)

There is no periodic monitoring for this condition (1.*3* lbs NOx/ton Black Liquor Solid fired) in the applicable requirement. Compliance was to be determined by calculating emissions based on black liquor solids (BLS) throughput and emission factors from previous stack tests. The petitioner objected to the use of previous stack tests, rather than current source tests, as the basis for calculating current emissions. EPA objected because the three previous source tests provided as support (August 3, 1990; February 6, 1995; and December 10, 1997) showed the unit was emitting NOx at 68-79% of the standard, an inadequate margin (in EPA's view) to justify no additional monitoring. On May 9, 2000, Horizon Engineering conducted a source test for the Camas Mill that showed that the unit was emitting NOx at less than 80% of the standard. A summary of the source tests are included in Table A.4.1.

Table A.4.1 No. 3 Kraft Recovery Furnace – NOx Source Test Summary

Date	Liquor Firing Rate, Gpm	Liquor Solids, %	Excess Oxygen, %	NOx Concentration, ppm	NOx Emission Rate, lb. / hr.	NOx Emission Rate, lb./TBLS
05-09-00	140	71.7	2.2	58	34.4	1.02
05-09-00	140	71.7	2.0	58	35.3	1.04
05-09-00	140	72.0	2.3	58	34.1	1.01
12-10-97	160	70.9	2.0	58	39.4	1.03
12-10-97	160	70.8	2.0	59	35.5	0.93
12-10-97	160	70.9	2.1	59	35.5	0.93
12-10-97	160	71.0	2.2	60	37.1	0.97
02-06-95	130			58	29.7	0.96
02-06-95	130			59	29.1	0.94
02-06-95	130			63	29.7	0.96
08-03-90	140	71.5	1.6	62	32.9	0.99
08-03-90	140	71.6	1.8	61	33.0	0.99
08-03-90	140	71.7	1.7	54	29.4	0.88

gpm - gallons per minute %- percent **ppm –part per million** TBLS – tons black liquor solids
Note: The normal operating range for excess oxygen while firing liquor is 1.9 to 2.4%

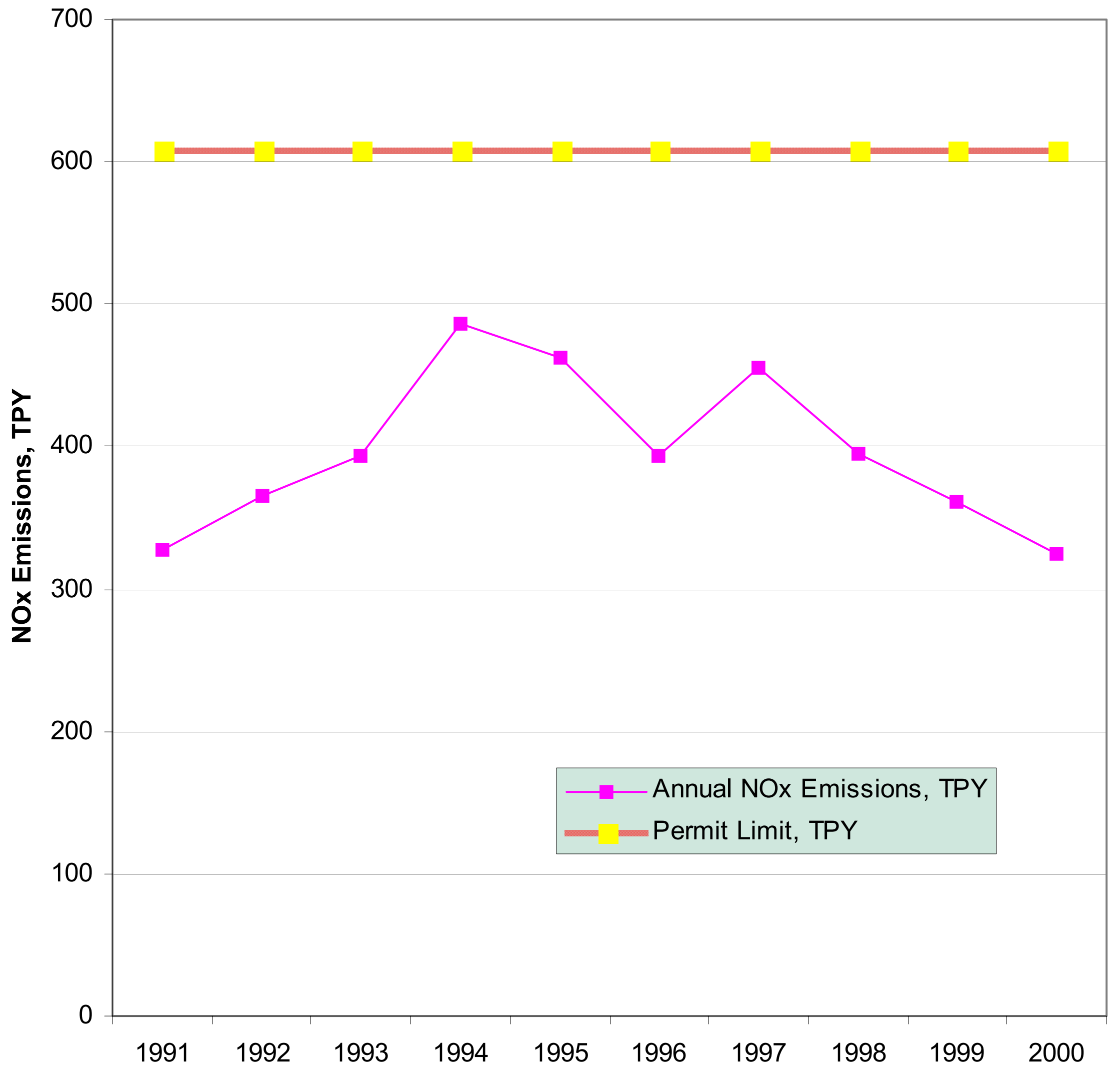
The normal black liquor flow rates to the No. 3 Kraft Recovery Furnace range from 130 to 140 gallons per minute. The source tests were conducted either at or above the normal black liquor flow rates. The most recent source tests are utilized as the emission factor to calculate the annual NOx emissions. The source tests were conducted at liquor firing rates of 130 to 160 gallons per minute. In the past two years the annual average black liquor flow to the No. 3 Kraft Recovery Furnace has been 140 and 136 gallons per minute respectively. Table A.4.2 displays the average liquor firing rates for 1999 and 2000. The test results were used to derive NOx mill-specific emission factors and compute the NOx emissions to assure the conservative estimates. The Director of Office of Air Quality in the EPA Region 10 and the Washington Department of Ecology had approved the method and imposed these requirements in the PSD Permit Condition No. 4.

Table A.4.2. Liquor Firing Rates for No. 3 Kraft Recovery Furnace

Calendar Year	1999 Liquor Firing Rate, gpm	2000 Liquor Firing Rate, gpm
Period		
1	151	154
2	146	155
3	155	125
4	141	140
5	140	93
6	145	139
7	143	134
8	101	108
9	135	137
10	125	146
11	158	144
12	142	154
Operation Average	**140**	**136**
Source Test		
05/09/00	140	140
12/10/97	160	160
02/06/95	130	130
08/03/90	140	140
Source Test Average	142.5	142.5

The annual NOx emissions for No. 3 and No. 4 Kraft Recovery Furnaces are displayed in Figure A.4.3.

Figure A.4.3 - No.3 & No.4 Kraft Recovery Furnace NOx Emissions 1991 to 2000



The NOx concentration and NOx Emission Rate vary in a narrow range. A detailed discussion of NOx variability for Kraft Recovery Furnaces was included in the original AOP Support Document dated August 1999. A review of the annual NOx emissions from both Kraft Recovery Furnaces, displayed in Figure A.4.3, reveal that the mill is comfortably under its permit limit of 609 tons per year.

Despite the history of applicable requirements, Ecology proposes to address the petitioner's and EPA's concern by requiring a new source test for NOx at the No. 3 Kraft Recovery Furnace once each permit term to ensure that the emission factors reflect the current condition of the unit. The mill would also be required to record and report operating conditions of the unit during each test. Operating conditions such as black liquor solids, auxiliary fuel fired, steam flow rate, and excess oxygen will be recorded.

Ecology has considered the monitoring option using the CEMs for the recovery furnaces but determined that the option is not reasonable for several reasons, which are discussed below.

- *NOx emissions from these kinds of processes do not change very much with time; stage-air combustion keeps the temperature below the NOx formation temperature (thermal NOx) and the nitrogen content in black liquor is constant (fuel NOx). [NCASI Special Report 99-01, April 1999, "A Review of NO_x Emission Control Strategies for Industrial Boilers, Kraft Recovery Furnace, and Lime Kiln.", and Source Test Data 1990, 1995, and 2000, Fort James Camas LLC.] In the NCASI report, it indicates that NO_x is generated strictly from black liquor combustion in kraft recovery furnaces from the nitrogen content "fuel NO_x" mechanism pathway. Our review of the NO_x test results from 1990 to 2000 reveals that the concentrations of NO_x emissions at the No.3 and 4 Recovery Furnaces are fairly constant over time. Ecology found that the furnaces were operated over time at a desirable base-load as discussed below. Therefore, NO_x emissions are expected to vary insignificantly.*
- *NOx tests in 1990, 1995, and 2000 conducted for the No. 4 Recovery Furnace clearly showed the NO_X emissions were consistently under permit limit, and for the majority of the results were well below the permit limit. EPA has indicated that the No. 4 furnace has tested close to the limit. This statement is true for the source test conducted in 1990; one of the test runs was at ninety four percent of the limit (1.5 lbs of NO_X per ton of black liquor solids). The 1990 test was an initial performance test for the No. 4 Kraft Recovery Furnace and the furnace was required to operate at or near the design rate with steam generated at a rate of 428,000 to 441,000 pounds per hour. These values are <u>outside the normal operating range</u>, normal ranges are from 350,000 to 380,000 pounds per hour. All subsequent tests in 1995 and 2000 showed that the average result has been significantly below the limit, at 75% of the NO_X limit. These tests were conducted when the steam generation rate was from 368,000 to 373,000 pounds per hour. In Ecology's opinion, these tests provide a sufficient margin of compliance.*
- *Combined NOx limit for No. 3&4 Recovery Furnaces for 5-yr average indicates below limit at the margin of compliance of under 80%.*
- *Kraft Recovery Furnaces are designed for chemical recovery purposes. Once the operation is optimized to maximize the chemical recovery, it is base-loaded. Thus, any deviation from the base-loaded operation is not desirable; hence stable NOx emissions have resulted as illustrated in the support document.*
- *The furnace does not rely on a control device for compliance. There are currently no emission controls for $NO_{X\,at}$ the No. 4 Recovery Furnace.*

NOx CEMS are not a common requirement for recovery furnaces in the NW mills; Ecology's informal survey shows that 12 out 14 recovery furnaces do not have CEMs and/or periodic testing because both the furnace design and actual operation have prevented wide variability of the NO_X emissions.

2. <u>Condition B.4</u> (NOx Standard for No. 4 Kraft Recovery Furnace)

As with Condition A.4, there is no periodic monitoring in the underlying applicable requirement for this standard (1.5 lbs NOx/ton BLS). Compliance was to be determined by calculating emissions based on BLS throughput and emission factors from previous source tests. The petitioner objected to the use of previous stack tests, rather than current source tests, as the basis for calculating current emissions. EPA objected because the two previous source tests provided as support (September 25, 1990; and February 8, 1995) showed the unit was emitting NOx at 74-95% of the standard, an inadequate margin (in EPA's view) to justify no additional monitoring. The May 6, 2000 source test showed NOx emissions at under 77% of the standard. A summary of the source tests are included in Table B.4.1.

Table B.4.1 No. 4 Kraft Recovery Furnace – NOx Source Test Summary

Date	Liquor Firing Rate, gpm	Liquor Solids, %	Excess Oxygen %	NOx concentration, ppm	NOx Emission Rate, lb. / hr.	NOx Emission Rate, lb./TBLS
05-06-00	212	72.0	2.6	57	58.6	1.15
05-06-00	212	72.0	2.5	57	58.1	1.14
05-06-00	212	72.0	2.4	56	55.5	1.09
02-08-95	220			68	57.9	1.11
02-08-95	220			64	58.5	1.12
02-08-95	220			68	63.3	1.21
09-25-90	225	71.6	2.3	66	75.8	1.41
09-25-90	225	71.4	2.1	64	73.4	1.37
09-25-90	225	71.5	2.3	60	69.9	1.30

Note: The normal operating range for excess oxygen while firing liquor is 2.0 to 2.5%

The normal black liquor flow rates to the No. 4 Kraft Recovery Furnace range from 170 to 210 gallons per minute. The source tests were conducted at above normal black liquor flow rates. The most recent source tests are utilized as the emission factor to calculate the annual NOx emissions. The source tests were conducted at liquor firing rates 212 to 225 gallons per minute. In the past two years the annual average black liquor flow to the No. 4 Kraft Recovery Furnace has been 181 and 178 gallons per minute respectively. Table B.4.2 displays the average liquor firing rates for 1999 and 2000. The test results were used to derive NOx mill-specific emission factors and compute the NOx emissions to assure the conservative estimates. The Director of Office of Air Quality in the EPA Region 10 and the Washington Department of Ecology had approved the method and imposed these requirements in PSD Permit Condition No. 4.

Table B.4.2 Liquor Firing Rates for No. 4 Kraft Recovery Furnaces

Calendar Year	1999 Liquor Firing Rate, gpm	2000 Liquor Firing Rate, gpm
Period		
1	187	208
2	192	194
3	177	183
4	197	185
5	134	121
6	195	186
7	184	184
8	208	198
9	170	161
10	158	148
11	176	181
12	192	189
Operation Average	**181**	**178**
Source Test		
05/06/00	212	212
02/08/95	220	220
09/25/90	225	225
Source Test Average	**220**	**220**

The NOx concentration and NOx Emission Rate vary in a fairly narrow range. A detailed discussion of NOx variability for Kraft Recovery Furnaces was included in the original AOP Support Document dated August 1999. A review of the annual NOx emissions from both Kraft Recovery Furnaces, displayed in Figure A.4.3, reveal that the mill is comfortably under its permit limit of 609 tons per year.

NOx tests in 1990, 1995, and 2000 conducted for the No. 4 Recovery Furnace clearly showed the NO_X emissions were consistently under permit limit, and for the majority of the results were well below the permit limit. EPA has indicated that the No. 4 furnace has tested close to the limit. This statement is true for the source test conducted in 1990; one of the test runs was at ninety four percent of the limit (1.5 lbs of NO_X per ton of black liquor solids). The 1990 test was an initial performance test for the No. 4 Kraft Recovery Furnace and the furnace was operated at or near the design rate with steam generated at a rate of 428,000 to 441,000 pounds per hour. These values are <u>outside</u> the normal operating conditions, normal ranges are from 350,000 to 380,000 pounds per hour. All subsequent tests in 1995 and 2000 showed that the average result has been significantly below the limit, at 75% of the NO_X limit. These tests were conducted when the steam generation rate was from 368,000 to 373,000 pounds per hour. In Ecology's opinion, these tests provide a sufficient margin of compliance.

Ecology proposes to address the petitioner's and EPA's concern by requiring an annual source test for NOx at the No. 4 Kraft Recovery Furnace for this permit term to ensure that the emission factors reflect the current condition of the unit. The mill would also be required to record and report operating conditions of the unit during each test. Operating conditions such as black liquor solids, auxiliary fuel fired, steam flow rate, and excess oxygen will be recorded.

Ecology has considered the monitoring option using the CEMs for the recovery furnaces but determined that the option is not reasonable for several reasons as discussed earlier in Condition A.4 above.

3. Condition G.6 (Annual NOx Standard for No. 4 Lime Kiln)

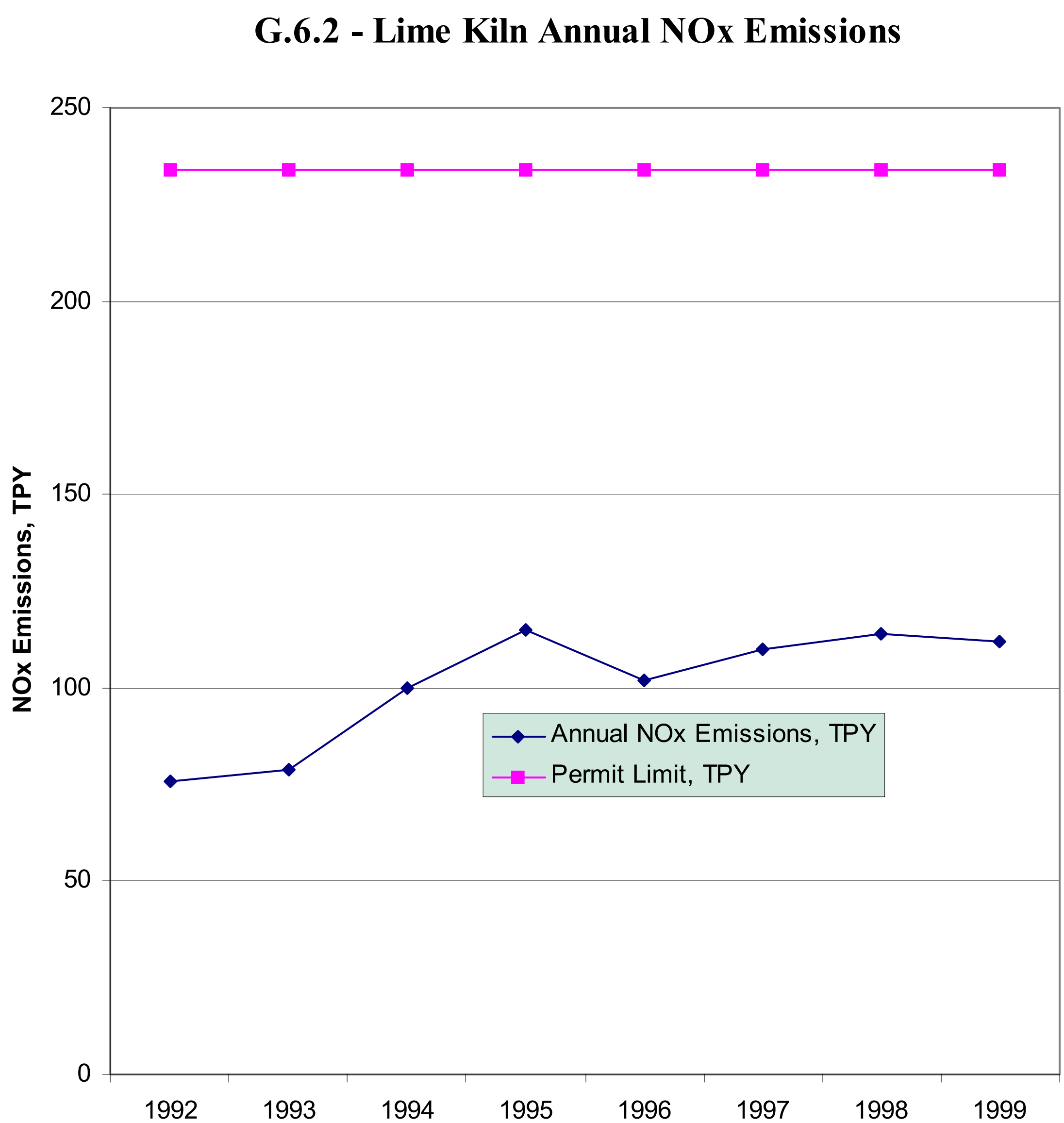
There is no periodic monitoring in the underlying requirement for this condition. Compliance was to be determined through annual calculation of NOx emissions based on current production information and emission factors from prior source tests. To support this compliance assurance method, the mill previously supplied Ecology with emissions calculations from 1994 through 1998 showing that NOx emissions were well below the standard for all years, ranging from only 30% of the standard to just 49% of the standard. In 1999 and 2000, annual NOx emissions were less than 50% of the standard. The petitioner objected to the use of previous stack tests, rather than current source tests, as the basis for calculating current emissions. EPA objected because "This margin of compliance alone, however, does not provide a sufficient basis for determining that NOx emissions per unit of production will not change over the life of the permit. Absent additional information supporting Ecology's decision that no further testing or monitoring is required, monitoring for this condition should include, at a minimum, either periodic source testing to determine the emission factor or the identification and monitoring of parametric ranges in addition to current production information which, if maintained, would provide a reasonable assurance of compliance with the NOx standard during the anticipated range of operations." A summary of the source tests is included in Table G.6.1.

Table G.6.1 No. 4 Lime Kiln NOx Results

Date	Lime Mud Firing Rate gpm	Stripper Off-Gas Flow acfm	NCG Flow acfm	NOx Concentration ppm	NOx Emission Rate lbs/hour
09-12-00	347	724	5091	158	20.43
09-12-00	354	581	5069	119	7.75
09-12-00	360	547	5061	79	7.24
05-04-00	268	0	0	130	8.6
05-04-00	295	0	0	164	8.7
05-04-00	295	0	0	139	13.6

02-14-95	**341**	**0**	**0**	**346**	**33.0**
02-14-95	**350**	**0**	**0**	**286**	**20.1**
02-14-95	**350**	**0**	**0**	**249**	**26.5**

The annual NOx emissions for the Lime Kiln are displayed in Figure G.6.2.



(emission for 2000 was 97 tons per year.)
Fort James Camas' position is that "with prior years' emissions consistently less than half of the applicable limit, no additional monitoring should be required or warranted to assure that No. 4 Lime Kiln will comply with its annual NOx standard. This is consistent with EPA's now-repudiated Periodic Monitoring Guidance, which listed as one of the factors in evaluating periodic monitoring the low likelihood of violating the applicable requirement, and

with EPA's second White Paper, which allows for the maintenance of the monitoring status quo where the imposition of additional monitoring would not significantly enhance the ability of the permit to assure compliance with applicable requirement. It is also consistent with EPA's January 1995 transition policy, under which EPA allowed sources with actual emissions less than half of the major source threshold to remain as minor sources without applying for either a Title V permit or FESOP, as long as they kept certain records demonstrating that they remained under the 50% threshold.

Nevertheless, Ecology proposes to address the petitioner's and EPA's concern by requiring a new source test for NOx at the Lime Kiln once each permit term to ensure that the emission factors reflect the current condition of the unit. The mill would also be required to record and report operating conditions of the unit during each test. Operating conditions (lime mud flow rate, auxiliary fuel fired, and excess oxygen) will be recorded during the test.

4. <u>Condition H.6</u> (Annual NOx standard for Magnefite Recovery Furnace and Acid Plant)

There is no periodic monitoring for this condition in the underlying applicable requirement. Compliance with the standard was to be assured by calculating and reporting annual emissions based on current production information and emission factors from prior source tests. The petitioner objected to the use of previous stack tests, rather than current source tests, as the basis for calculating current emissions. EPA objected because the three previous source tests provided as support (February 15, 1995; November 3-5, 1997; and June 15-17, 1999) showed the unit was emitting NOx at 97%, 84%, and 88% of the standard, respectively, an inadequate margin to justify no additional monitoring. The series of tests conducted in 1999 demonstrated that the following emission factors, see Table H.6.1, were appropriate for the Magnefite Recovery Furnace at the Camas Mill.

Table H.6.1 Camas Magnefite Recovery Furnace/Acid Plant Performance Test Results

Pollutant	Emission Factor[a] lb/ton Red Liquor Solids[b]	Emission Factor[a] lb/therm natural gas
CO	0.24	
NO_x	0.56	0.054
VOC	0.09	

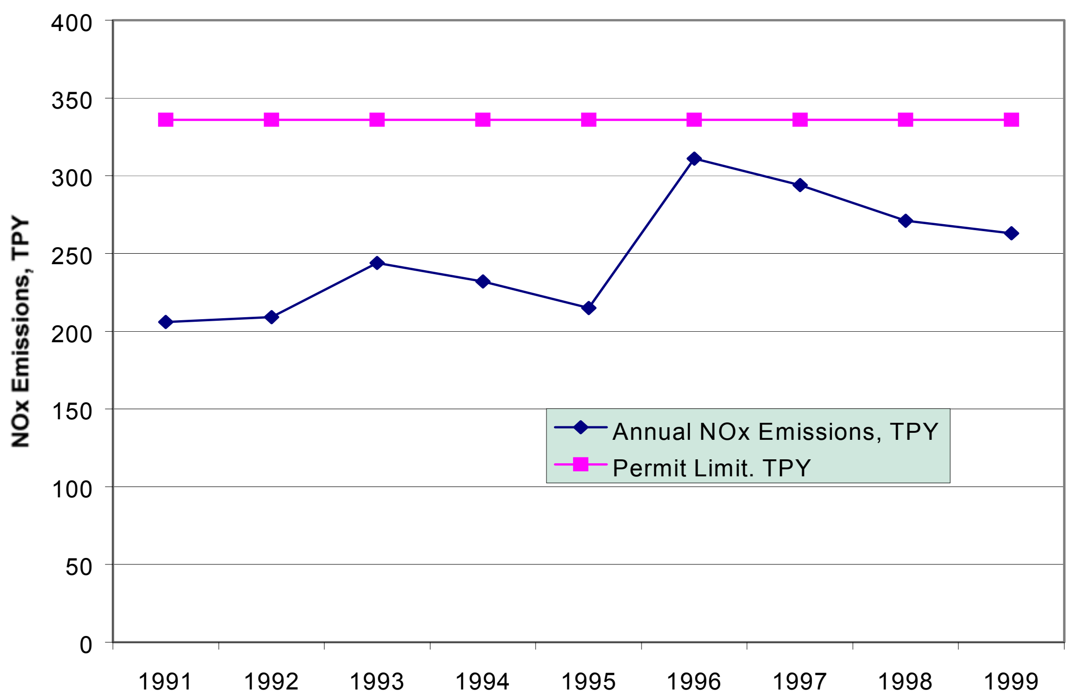
[a]Previously submitted test data demonstrated a strong correlation between the amount of natural gas added to the fuel mixture and the NOx produced. It was thus possible to separate the NOx contributions from the two fuels, red liquor and natural gas, and calculate the respective emission factors. There was no similar correlation for CO or VOC. The emission factors were taken from the total amount of CO or VOC produced at mid-range red liquor and natural gas firing rates.
[b]Red Liquor Solids - RLS

With construction of the Foul Condensate Steam Stripping System, the Magnefite Recovery Furnace is the primary incinerator for both the Kraft Non-Condensable gases and the Stripper-Off-Gases. A series of source tests were conducted in August, September, and October 2000 that revealed that there is a strong correlation between the amount of NOx generated and the Steam Flow generated by the Magnefite Recovery Furnace, see Figure H.6.1. The Magnefite

Recovery Furnace for 1999 and 2000 has operated in a fairly narrow range generating Steam Flows predominantly in the 205,000 to 220,000 pounds per hour. Ecology may require such testing to be performed in the future to determine the correlation between steam production rate vs. NOx emissions.

The annual NOx emissions for the Magnefite Recovery Furnace are displayed in Figure H.6.2.

Figure H.6.2 - Magnefite Recovery Furnace Annual NOx Emissions



(Emissions for 2000 were 294 tons per year)

On October 2, 2001 the mill permanently shut down the Magnefite (sulfite) recovery process. Red Liquor is no longer generated, recovered or used as a fuel. The mill is considering converting the furnace to a power boiler or constructing a new standalone incinerator. In the interim the furnace is operating as a primary device to control the emissions of the kraft non-condensable gases (NCGs) and the foul condensate steam stripper off gases (SOGs) as required by WAC 173-405.

With the exception of the red liquor, the fuels and other gases to be fired in the furnace will be unchanged; i.e., natural gas, fuel oil, non-condensable gas, and SOGs. Even with the termination of red liquor, the furnace is operated as permitted by the Orders No. PSD-88-3/Modification 2 and DE-88-360/Modification 2. By design, it is capable of producing needed *steam to the maximum rate by burning exclusively either red liquor, which is no longer an available fuel, natural gas, or fuel oil or any combination of fuels. The existing Orders do not impose any restrictions on BTU inputs by particular fuels to operate the unit. Based on the operation records, the furnace do have the capability to meet the steam demand by using either red liquor, or natural gas, or fuel oil exclusively or in combination of the fuels.*

Fort James Camas LLC indicated that the recovery furnace/power boiler conversion application will be complete in October 2003, and the operators submitted the required documents to Ecology sometime, including a Title I and minor source review/notice of construction application for approval by Ecology. In September 2003, Fort James submitted the PSD and New Source Review application to Ecology for review and approval. The conversion application will allow Fort James to install new equipment and modify to the existing recovery furnace to be a power boiler, including new burners, controls, boiler tube modifications, etc. Without this installation/modification to the existing furnace, the furnace cannot be operated as a true and efficient power boiler.

A special study was conducted to ensure that the emission factors reflect the current condition of the unit. The mill would also be required to record and report operating conditions of the unit during each test. Operating conditions such as fuel firing rate, steam flow rate, NCG flow rate, SOG flow rate, and excess oxygen levels will be recorded.

Since this emission unit will be using predominantly natural gas as the fuel source to replace of the red liquor solids, the scrubber flow rate and pressure drop are therefore no longer the valid operating parameters. Therefore, Condition H.10 containing the surrogate parameters has been deleted for the above reason. With the <u>future</u> change to a power boiler, it would be Ecology's intent to consider the use of a NOx Continuous Emission Monitor (CEM) and review the necessity for other CEMs. For the interim a monthly particulate test and the SO_2 CEM would still be required and believed to be sufficient.

5. <u>Condition I.4</u> (Annual SO_2 Standard for No. 3 Power Boiler)

There is no periodic monitoring for this standard in the underlying applicable requirement. Compliance was to be assured by calculating annual SO_2 emissions based on current fuel use information and emission factors from prior source tests. The petitioner objected to the use of emission factors or previous stack tests, rather than current source tests, as the basis for calculating current emissions. EPA objected because the emission factors and previous 1998 source tests provided as support were not adequate to justify no additional monitoring.

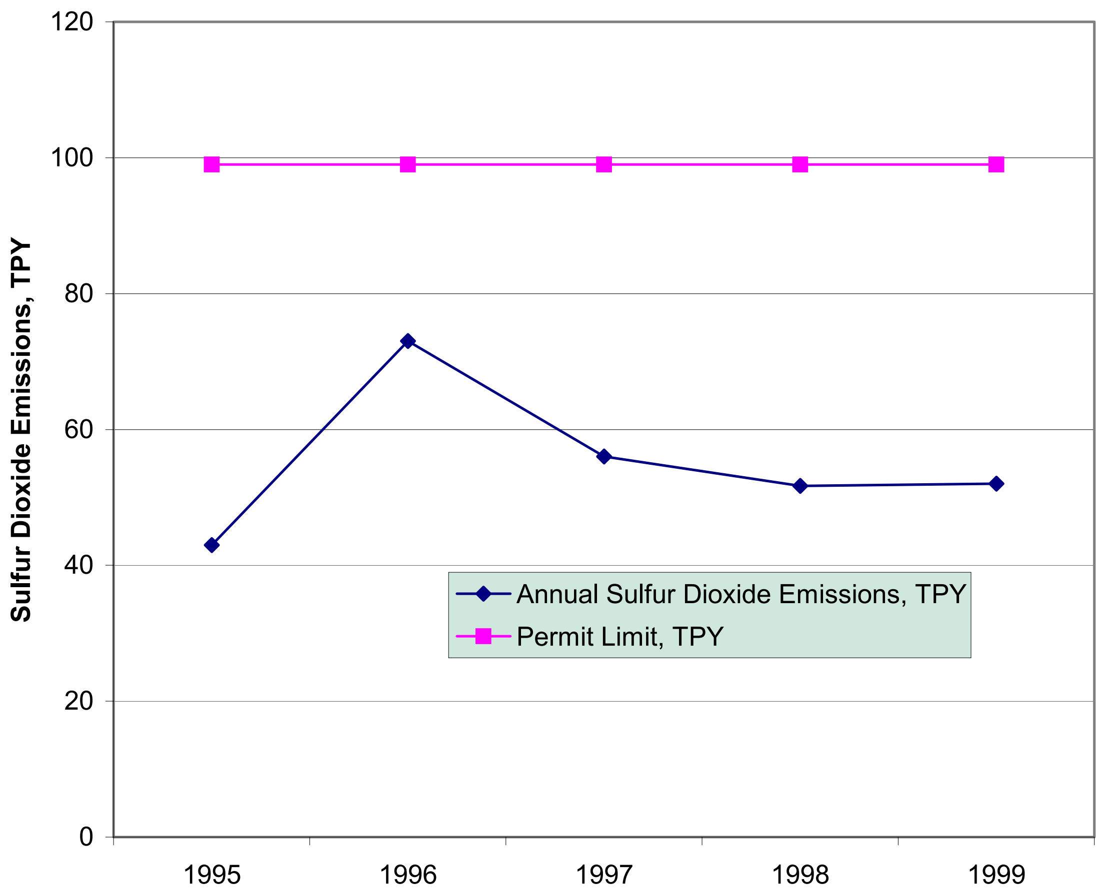
Calculations of emissions for the years 1994, 1995, 1996 and 1997, based on AP-42 emission factors, showed that annual SO_2 emissions were always less than 53% of the standard. Fort James Camas also provided source test data from 1998 showing that the AP-42 emission factor used for the years 1994 through 1997 was, in fact, representative of SO_2 emissions from this unit. In May 2000, Horizon Engineering conducted a source test for the mill that showed SO_2 emissions at less than 50% of the standard. A summary of the source tests are included in Table I.4.1.

Table I.4.1 SO_2 Source Test Results

Date	Solid Fuel Firing Rate, Units/hour	Natural Gas Firing Rate, 1000 scf/hr	SO_2, ppm	SO_2, lb/hr
05-05-00	11	32.59	17	9.7
05-05-00	10	48.87	21	13.6
05-05-00	11	52.70	17	9.9
03-10-98	7.1	112.5	27	15.0
03-10-98	7.6	117.0	28	16.5
03-11-98	6.3	64.1	20	10.5

The annual SO_2 emissions for the Power Boiler No. 3 are displayed in Figure I.4.2.

Figure I.4.2 - Power Boiler No.3 - Annual Sulfur Dioxide Emissions



Fort James Camas believes "that no additional periodic monitoring is necessary to assure compliance with this condition, given that prior years' emissions have been roughly half or less of the permit standard, and given that the AP-42 emission factors used to calculate emissions were confirmed by a source test as recently as 2000."

Nevertheless, Ecology proposes to address the petitioner's and EPA's concern by requiring a new source test for SO_2 at the No. 3 Power Boiler once each permit term to ensure that the emission factors reflect the current condition of the unit . The mill would also be required to record and report operating conditions of the unit during each test. Operating conditions (hog fuel firing rate, natural gas fired, steam flow rate, and excess oxygen) will be recorded during the test.

<u>What is the contribution of SO_2 emissions from primary clarifier solids?</u>

The Energy and Recovery Modernization Project rebuilt the No. 3 power boiler in 1990 to burn woodwaste and natural gas. Woodwaste, by definition, consists of wood pieces or particles, as well as, primary clarifier solids, sawdust, bark, pulp, hog fuel, and log sort.

The recent concern by EPA related to the contribution to sulfur dioxide (SO_2) emissions at the No. 3 power boiler from primary clarifier solids (short as primary solids). Primary solids are wood particles/wood fibers generated as a by-product of a primary treatment of the waste water treatment system. By definition, the primary solid is of the woodwaste that is exempt from solid and hazardous regulations when burning in hog-fuel power boilers as part of fuels. The following analysis will demonstrate the contribution of the Fort James' primary solids to sulfur dioxide emissions.

Based on fuel composition test results in September 1995 that submitted to Ecology:

- Sulfur loading from hog fuel: 0.9 % sulfur
- Sulfur loading from primary solids: 1.8 % sulfur
- Daily maximum primary solids produced: 50 tons per day
- Daily hog fuel usage: 300 tons per day

In 2000, the source tests conducted by Horizon Engineering Testing firm indicated the sulfur dioxide emissions were 46 tons sulfur dioxide per year (an average of three tests 11.07 lbs per hour), which were of less than 50% of the standards (a permit limit at 99 tons SO_2 per year). It is worthy to note that properties of the hog fuel and primary solids have not changed since the fuel tests completed in September 1995.

The following calculations will estimate the contribution to sulfur dioxide emissions from the hog fuel with a mix of the primary solids. First, assume that the sulfur dioxide loading from the primary solids is twice as much from the hog fuel. This assumption is based on the results from the fuel composition analysis in 1995 as cited above. Secondly, assume that the Horizon Engineering tests were conducted when the hog fuel was exclusively fired in the No. 3 power boiler. This is a conservative assumption because the actual fuel composition is normally of a mix of hog fuel and primary solids. The emissions per ton of fuel were:

$$\frac{46\, tons\ SO_2\ \ per\ year}{350\, tons\ \ fuel} = 0.1314 \frac{tons\ SO_2\ \ per\ year}{ton\ \ fuel}$$

Assume all generated primary solids could be burned in the boiler, so the fuel composition were 50 tons of primary solids and 300 tons of hog fuel. Since sulfur load of primary solids is twice as much from the hog fuel, the sulfur dioxide emissions would have been greater as shown below:

$$0.1314 \frac{tons\ SO_2}{ton\ fuel} \times 1 \frac{sulfur\ load}{hog\ fuel} \times 300\ tons\ hog\ fuel + 0.1314 \frac{tons\ SO_2}{ton\ fuel} \times 2 \frac{sulfur\ load}{primary\ solids} \times 50\ tons\ primary\ solids$$

$$= 39.42\ tons + 13.14\ tons = 52.56\ tons\ of\ SO_2\ per\ year$$

Thus, the contribution from the primary solids and hog fuel in the specific illustration are 25% and 75%, respectively. In this case, the sulfur emissions from the mixed fuels would be 57% (=52.56/99) of the permit limit, a large margin of compliance.

6. Condition N. 2 (Annual Particulate Standard for Screen Fines Truck Bin Cyclone) and Condition O.2 (Annual Particulate Standard for Chip Packing Cyclone)

EPA could not determine whether the applicable requirements for these units contain periodic monitoring. The permit requires that compliance be demonstrated by submitting annual reports of particulate matter emissions calculated based on current throughput and emission factors from prior source tests. The permit also requires the mill to conduct monthly visual inspections of the cyclones to assure that they remain in good condition.

Previous source tests for these units showed that each had emissions of less than one ton/year. For the truck bin cyclone, emissions were less than 39% of the applicable standard (2.6 TPY). For the chip packing cyclone, they were less than 72% of the standard (1.4 TPY). For each of these units, the emission limit equals the potential to emit.

Fort James Camas believes "that no additional monitoring is necessary to assure compliance for these minor units. With emissions less than 1 TPY each, they are nearly small enough to be considered insignificant emissions units (0.75 TPY) under the Washington Title V regulations (WAC §173-401-530), for which Ecology is prohibited from imposing monitoring requirements, and in fact are arguably little different in emissions from chipping activities and chip feeders, which are categorically exempt. The costs of additional monitoring are simply not justified by the benefits that theoretically could be gained by more closely monitoring sources with less than a ton of emissions. Annual reporting of particulate emissions based on emission factors from previous source tests, combined with the monthly inspections that Ecology has already imposed, is more than adequate to assure compliance with these conditions."

In reviewing these particular pollution control devices, Ecology has determined that these are essentially minor units and that the cyclones have fairly steady throughputs and by the nature of their design will consistently control wood particles provided the units are inspected regularly. The principle cause of excess emissions is holes developing in the cyclone or pluggage of the cyclones and our experience reveals that a monthly inspection program addresses these issues. Ecology determines that a monthly inspection program is adequate for compliance purposes.

7. **Permit Section B, Conditions B.1, B.2 and B.6 (Grain-Loading Standards for No. 4 Kraft Recovery Furnace)**

For this condition, there is periodic monitoring provided in the underlying applicable requirements. As the Order mentions, the applicable requirements provide for monthly Method 5 source tests as monitoring for the grain-loading standards. This alone is adequate to ensure compliance and could have been accepted "as is" as the Title V periodic monitoring. Fort James' position is that Appalachian Power stands for the proposition that EPA and state permitting agencies cannot add to existing periodic monitoring requirements on the basis that they are not "sufficient." Fort James asserts that if periodic monitoring requirements exist in the underlying requirements, they must simply be incorporated into the permit without further review or evaluation unless the state adds monitoring requirements pursuant to its own separate regulatory authority.

Here, the monthly Method 5 tests are not the only periodic monitoring required in the permit. The permit also requires monitoring and maintenance of certain scrubber pressure drop and flow rate ranges. EPA objects to the sufficiency of this parameter monitoring based on the fact that one out of the 84 monthly source tests conducted since 1993 showed non-compliance with the grain-loading standard. Ecology believes that this is an insufficient basis to require additional periodic monitoring, especially since the monthly Method 5 tests are more than adequate to satisfy the periodic monitoring requirements in and of themselves under Appalachian Power. In addition, Fort James has pointed out that the one exceedance noted in the last 7 years can be attributed to deterioration of the electrostatic precipitator. The consent order that Ecology and the mill entered into following the exceedance required Fort James to repair and reconstruct portions of the ESP. Since that work was completed and the improved ESP placed into operation in 1998, no exceedances have occurred, i.e., 100% compliance based on the source test results.

Despite this history and the additional amount of monitoring already being performed, Fort James proposes to address the petitioner's concern by conducting a one-year study to demonstrate the correlation between the surrogate parameters and the opacity and particulate standards."

Ecology proposes to address the petitioner's and EPA's concern by requiring that Fort James Camas Mill perform a one-year study, subject to approval by the Department, to relate stack opacity and grain-loading to scrubber parameters. At the conclusion of the study, Ecology will set limits for the appropriate control device operating parameters. A one-year time is necessary as the various stacks interact with each other and weather conditions may negate visual opacity readings, and both of these factors should be considered when designing the study.

8. **Permit Section H, Conditions H.1, H.3 and H.10 (Grain-Loading Standard and Opacity Standard for Magnefite Recovery Furnace and Acid Plant)**

On October 2, 2001 the mill permanently shut down the Magnefite (sulfite) recovery process. Ecology has requested that Fort James Camas LLC submit a Notice of Construction and an application to modify the Air Operating Permit as soon as practicable but by no later than June 30, 2002. This application would designate the final primary treatment system for the Kraft non-condensable gases (NCG) and the foul condensate steam stripper off-gases (SOG). At this time the Magnefite Recovery Furnace is used as the temporary primary incineration device for the NCGs and SOGs with the Lime Kiln designated as the backup incineration device. In the interim, the mill is operating the Magnefite Recovery Furnace on natural gas or No. 6 Fuel Oil (less than 2% sulfur content by weight) to control the emissions of the NCGs and SOGs as required by WAC 173-405, the Kraft Pulping Mills regulations. In addition to the shutdown of the Magnefite (sulfite) Recovery process, four (4) paper machines were also shutdown on October 26, 2001. The quantity of process steam necessary for operations has therefore been reduced. For the interim operational mode of the Magnefite Recovery Furnace, the steam output has been reduced. Prior to the shutdown of the chemical recovery process the steam production varied in a fairly narrow range from 180,000 to 220,000 pounds per hour with an annual average of 204,000 pounds per hour. During that time red liquor was used as the primary fuel while natural gas and No. 6 fuel oil were only used on a needed basis. Since October 26, 2001 the furnace has produced steam in the range of 110,000 to 190,000 pounds per hour with the average steam production during that period of 130,000 pounds per hour, a 37 percent reduction. The fuel necessary to produce this quantity of steam is significantly lower than under the previous operation. The amount of fuel/air mixture required for efficient combustion is also significantly reduced. Since the scrubber parametric indicators derived for use as the particulate surrogate parameters were based on the before-shutdown configuration, these parameters are now no longer valid. Condition H.10 in the permit requires the continuous monitoring of certain scrubber parameters as a performance indicator such as red liquor solids content, pressure drop through the wet scrubber, and scrubbing flow rate through the first stage of the scrubber. These indicators are now neither existed nor credible due to the change in fuel and a deviation from scrubber/furnace original design criteria. For example, red liquor does not exist and has not used as fuel since the shutdown. In addition, based on the current operational mode, the emission unit's stack flow which averaged 70,000 dry standard cubic feet per minute (dscfm) now averages around 49,000 dscfm, a thirty percent reduction. The pressure drop of 0.2 inches of water across the scrubber is therefore no longer a credible indicator, because the stack flow has been lessened as shown above.

Ecology has thus informed Fort James to discontinue maintaining the red liquor solids fired, the scrubber pressure drop, and the associated flow rate, while burning exclusively with natural gas, until the Notice of Construction to be submitted as mentioned earlier. Thence, Fort James will propose necessary parametric indicators for review and approval by Ecology. In the interim, the Permittee will be required to conduct monthly particulate source tests and operate and maintain the SO_2 Continuous Emission Monitor during the operation of the Magnefite furnace to treat the NCGs and SOGs.